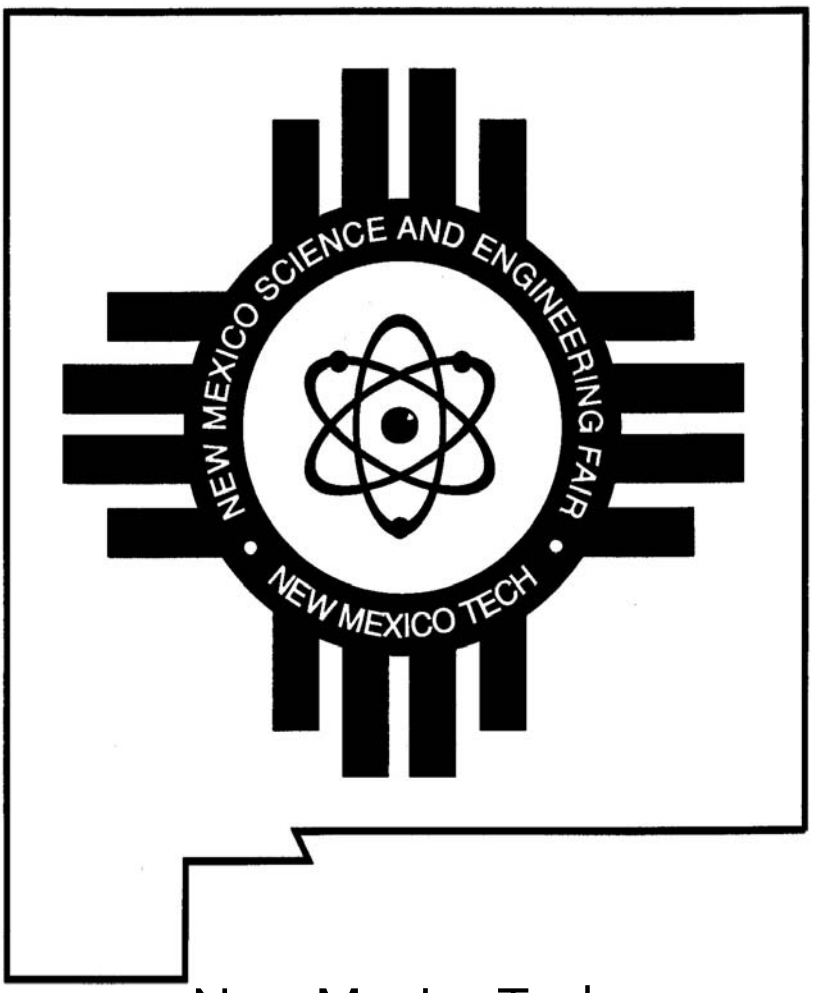
58th New Mexico Science & Engineering Fair

GUIDELINES FOR JUDGES



New Mexico Tech
Socorro, NM 87801

April 9-10, 2010

New Mexico Tech
SCIENCE • ENGINEERING • RESEARCH • UNIVERSITY

CITY OF SOCORRO

GENERAL INFORMATION

A science and engineering fair is a competition in which students can exhibit, demonstrate and discuss their projects with members of the scientific community and the public. It serves three major purposes: it stimulates an active interest in science and engineering; it provides an educational experience to students through exposure to judges and to the public; and it provides a forum for talented students to receive public recognition for their work.

Science Fairs begin at the local level and can lead to competition at the international level. An estimated 1.5 million students participate each year throughout the United States and in more than 40 countries worldwide.

New Mexico Science and Engineering Fair (NMSEF) is a non-profit program hosted by New Mexico Tech, an equal opportunity institution. NMSEF is a member of the New Mexico Activities Association. Financial support for the State Science Fair comes from New Mexico Tech, the State of New Mexico, registration fees, donations from a number of foundations, and corporate and individual donors.

The personnel of the New Mexico Science and Engineering Fair are:

Fair Director is responsible for organizing and overseeing all aspects of the Science Fair as well as recruiting and assigning regular and special award judges and organizing the judging committees.

Fair Coordinator is responsible for the student exhibitor aspect of the fair as well as providing assistance to the Fair Director. Contact Information: (575) 835-5678, sciencefair@admin.nmt.edu.

Committee Chairpersons are responsible for overseeing their judging committees. A committee is the group of judges responsible for judging exhibits in one category of one division (e.g., Senior Botany). The Committee is responsible for regular category awards and possibly any special awards which fall into that category.

CLASSIFICATION OF EXHIBITS

There are two divisions of exhibitors: Junior (grades 6 through 9) and Senior (grades 9 through 12). The divisions are further subdivided into categories:

Behavioral and Social Sciences
Botany/Plant Sciences
Cellular and Molecular Biology
Chemistry
Computer Science
Earth & Planetary Sciences
Energy and Transportation
Engineering
Environmental Sciences
Mathematical Sciences
Medicine and Health Sciences
Microbiology
Physics and Astronomy
Team Projects
Zoology

JUDGES

There are two different categories of judges at the New Mexico Science and Engineering Fair:

Category Awards judges and **Special Awards** judges each use different methods of evaluation and therefore require separate guidelines.

Category awards judges interview the finalists in each of the disciplines to determine the winners for these awards. Category awards include the place winners and honorable mention exhibits in each of the above categories, as well as the overall grand award winners. The top four exhibits in the Senior Division are chosen to represent New Mexico at the Intel International Science and Engineering Fair.

Special awards are sponsored by governmental agencies, the Armed Forces, professional societies, and industrial organizations, and are based upon criteria established by the sponsor. Judges for special awards may also serve as category award judges.

IMPORTANT POINTS FOR ALL JUDGES

1. *Judges should keep in mind that NMSEF is not only a competition, but an educational and motivating experience for students. The high point of the Science Fair experience for the majority of students is their interviews with the judges. Please be positive and gentle with suggestions of improvements. Give encouragement and constructive criticism for the work accomplished. Remember the age and delicate self-esteem of the students with whom you are working.*
2. Judges may not ask student exhibitors for their name, their school name, or where they're from. All Student Exhibitors should only be referred to by Exhibit Number.
3. Students may have worked on a research project for more than one year. However, for the purpose of judging, only research conducted within the current year is to be evaluated. Although previous work is important, it should not be considered as part of this year's project.
4. Examine the quality of the finalist's work, and how well the finalist understands his or her project and area of study. The physical display is secondary to the student's knowledge of the subject. As mentioned earlier, if the project is a multi-year effort, the Student Exhibitor is required to have a Continuation Form (Intel ISEF Form 7) visible at the project. Please be aware of the fact that the only work being judged should be that completed in the year prior to this Science Fair (2007).
5. When research is conducted in an industrial or institutional setting, the student is required to have documentation (Intel ISEF Form 1C), that provides a forum for the mentor or supervisor to discuss the project. Judges should review this information in detail when evaluating research.

6. Look for evidence of laboratory, field or theoretical work, not just library research or gadgeteering.
7. Compare projects only with those in the same competition and not with projects seen elsewhere under other circumstances.
8. As a general rule, judges represent professional authority to finalists. For this reason, judges should use an encouraging tone when asking questions, offering suggestions or giving constructive criticism. **Judges should not criticize, treat lightly, or display boredom toward projects they personally consider unimportant.** Always give credit to the finalist for completing a challenging task and/or for their success in previous competitions.
9. Keep in mind that projects are middle-high and high-school level, not Ph.D. or professional levels. Sometimes judges tend to go to extremes, giving students either far more credit than they deserve or not enough because it is not in the Nobel Prize category.
10. Please be discreet when discussing winners or making critical comments about judging, as students or adult escorts might overhear them. All results are confidential until announced at the awards ceremonies.
11. Harassment refers to behavior that is personally offensive, impairs morale, or interferes with the ability of exhibitors to perform well. Any harassment of a Student Exhibitor will not be tolerated. This policy refers to harassment due to age, race, color, national origin, ancestry, religion, sex, physical or mental disability. Harassment includes unsolicited remarks, gestures, or physical contact. Sexual harassment includes sexual advances, request for sexual favors, and other conduct which is sexual and offensive. We ask that you be aware of any conduct that might be interpreted as inappropriate.
12. Please keep in mind that the only people allowed in the Exhibit Hall during judging will be judges. If you bring any additional guests, please remind them that they will not be allowed in the Exhibit Halls except during Public Viewing.

JUDGING PROCEDURES—CATEGORY AWARDS

Category awards are based on the recognition of excellence in the conception and realization of a science or engineering project. Senior division awards recognize student capabilities leading to careers in science or engineering, and they may include college scholarships. Junior division awards encourage the student to make further efforts in the study of science and engineering.

A list of all of the exhibits is provided in the judge's packet. Exhibits are grouped by division and category. Student exhibitors select the category in which they wish their exhibit to be judged. Only under very exceptional circumstances do NMSEF officials move an exhibit from one category to another.

The judging is based on a two-step evaluation process. Initially, the exhibits are judged in the absence of the exhibitors. After the committees caucus, interviews are conducted, followed by final evaluations by committees.

Initial Briefing

Judging Assignments and Caucus Rooms are listed in judging packets. Judges must report to their assigned caucus room for initial briefing by the committee chairperson before going to the Exhibit Hall.

Initial Rating of Exhibits

At each of their assigned exhibits judges rate the exhibit on the basis of the five criteria described below. Scores are recorded on the Judging Forms provided. Ratings should be done individually and judges should initially judge all the exhibits assigned to them. All of this ensures that initially each exhibit will receive three independent evaluations. After the initial rating of exhibits, if judges have time, they are urged to survey the other exhibits in their category so that they can enter into later committee discussions regarding projects in the category.

Individual Projects	**Exceptional**	**Excellent**	**Very Good**	**Good**	**Acceptable**	**Points**
Creative Ability (30%)	25-30	19-24	13-18	7-12	0-6	
Scientific Thought (30%)	25-30	19-24	13-18	7-12	0-6	
Thoroughness (15%)	13-15	10-12	7-9	4-6	0-3	
Skill (15%)	13-15	10-12	7-9	4-6	0-3	
Clarity (10%)	9-10	7-8	5-6	3-4	0-2	
					TOTAL	
Team Projects	**Exceptional**	**Excellent**	**Very Good**	**Good**	**Acceptable**	**Points**
Creative Ability (25%)	21-25	16-20	11-15	6-10	0-5	
Scientific Thought (25%)	21-25	16-20	11-15	6-10	0-5	
Thoroughness (12%)	9.7-12	7.3-9.6	4.9-7.2	2.5-4.8	0-2.4	
Skill (12%)	9.7-12	7.3-9.6	4.9-7.2	2.5-4.8	0-2.4	
Clarity (10%)	9-10	7-8	5-6	3-4	0-2	
Teamwork (16%)	12.9-16	9.7-12.8	6.5-9.6	3.3-6.4	0-3.2	
					TOTAL	

Evaluation Criteria for Judging

Judging Criteria

Five judging criteria (six for team projects) are used to rank the exhibits within each category. Each exhibit will receive a numerical score from each judge. The five criteria (six for team projects) and the point value range assigned each of the criteria is listed below. The questions listed under the various criteria suggest the line of thought for evaluation purposes. Please remember that each criterion must stand on its own merits for rating and should therefore be judged independently of the others.

Creative Ability (Individual - 30, Team - 25)

1. Does the project show creative ability and originality in the questions asked?
   - the approach to solving the problem?, the analysis of the data?, the interpretation of the data?
   - the use of equipment?, the construction or design of new equipment?
2. Creative research should support an investigation and help answer a question in an original way.
3. A creative contribution promotes an efficient and reliable method for solving a problem. When evaluating projects, it is important to distinguish between gadgeteering and ingenuity.

Scientific Thought and Engineering Goals are separated into IIa and IIb to be used appropriately by category. There are also added questions for team projects.

II a. Scientific Thought (Individual - 30, Team - 25)

For an engineering project, or some projects in categories such as computer science and mathematical sciences, the more appropriate questions are those found in IIb, Engineering Goals.

1. Is the problem stated clearly and unambiguously?
2. Was the problem sufficiently limited to allow plausible approach? Good scientists can identify important problems capable of solutions.
3. Was there a procedural plan for obtaining a solution?
4. Are the variables clearly recognized and defined?
5. If controls were necessary, did the student recognize their need and were they correctly used?
6. Are there adequate data to support the conclusions?
7. Does the finalist or team recognize the data's limitations?
8. Does the finalist/team understand the project's ties to related research?
9. Does the finalist/team have an idea of what further research is warranted?
10. Did the finalist/team cite scientific literature, or only popular literature (i.e., local newspapers, Reader's Digest).

II b. Engineering Goals (Individual - 30, Team -25)

1. Does the project have a clear objective?
2. Is the objective relevant to the potential user's needs?
3. Is the solution workable? Acceptable to the potential user? Economically feasible?

4. Could the solution be utilized successfully in design or construction of an end product?
5. Is the solution a significant improvement over previous alternatives?
6. Has the solution been tested for performance under the conditions of use?

III. Thoroughness (Individual - 15, Team - 12)

1. Was the purpose carried out to completion within the scope of the original intent?
2. How completely was the problem covered?
3. Are the conclusions based on a single experiment or replication?
4. How complete are the project notes?
5. Is the finalist/team aware of other approaches or theories?
6. How much time did the finalist or team spend on the project?
7. Is the finalist/team familiar with scientific literature in the studied field?

IV. Skill (Individual - 15, Team - 12)

1. Does the finalist/team have the required laboratory, computation, observational and design skills to obtain supporting data?
2. Where was the project performed? (i.e., home, school laboratory, university laboratory) Did the student or team receive assistance from parents, teachers, scientists or engineers?
3. Was the project completed under adult supervision, or did the student/team work largely alone?
4. Where did the equipment come from? Was it built independently by the finalist or team? Was it obtained on loan? Was it part of a laboratory where the finalist or team worked?

V. Clarity (Individual - 10, Team - 10)

1. How clearly does the finalist discuss his/her project and explain the purpose, procedure, and conclusions? Watch out for memorized speeches that reflect little understanding of principles.
2. Does the written material reflect the finalist's or team's understanding of the research?
3. Are the important phases of the project presented in an orderly manner?
4. How clearly is the data presented?
5. How clearly are the results presented?
6. How well does the project display explain the project?
7. Was the presentation done in a forthright manner, without tricks or gadgets?
8. Did the finalist/team perform all the project work, or did someone help?

VI. Teamwork (Team Projects only- 16)

1. Are the tasks and contributions of each team member clearly outlined?
2. Was each team member fully involved with the project, and is each member familiar with all aspects?
3. Does the final work reflect the coordinated efforts of all team members?

First Caucus: Preliminary Scoring

Judges within each group or category meet in caucus at 10:00 a.m. to discuss the merits of individual determine potentially outstanding exhibits and make interviewing assignments. Judges should freely discuss both the merits and shortcomings of the exhibits in their category.

Interviewing the Exhibitors

- The exhibitors will be at their exhibits from 10:30 a.m.-12:00 noon.
- Judges will interview the students whose exhibits they judged earlier in the morning. In addition, top contenders should be interviewed by as many judges as possible.
- The committee chairperson may want to make specific interviewing assignments.

The importance of this portion of the judge's function cannot be overemphasized. The interview is perhaps the most educational aspect of the Science Fair experience. The interview provides a means for the judge to evaluate the exhibit more accurately and should also serve to stimulate the student's thinking, to suggest means of improving the work and working habits, to point out errors, and to provide feedback for the student from the judge, who is most likely a specialist in a given field. Science education within the State can only benefit from this practice, so be encouraging and supportive to the student.

Special care must be taken, especially in the Junior Division, not to intimidate the exhibitors. For many students, the interview is an extremely traumatic experience. Judges should go out of their way to make the exhibitors feel comfortable. A positive experience with a judge during the interview may encourage the student to pursue further scientific investigation, possibly leading to a career in science or engineering, whereas, an unpleasant, frightening experience may turn the student away from these disciplines indefinitely. **Judges should not criticize, treat lightly, or display boredom toward projects they personally consider unimportant.** Always give credit to the finalist for completing a challenging task and/or for their success in previous competitions.

Second Caucus: Determining the Awards

Following the interviews with the exhibitors, a second caucus is held to determine final placing of the exhibitors within each category. The students' preliminary placing together with their performance during the interview should be taken into consideration for the final evaluation of their exhibits.

The total number of regular awards made in each category must be limited to six. There will be a first, a second, and a third place award, with up to three honorable mentions. Once final results have been determined, all judges ***except the committee chairpersons*** are free to leave.

All results are **CONFIDENTIAL** until announced at the Awards Ceremonies. Judges may not inform student exhibitors of final decisions made for any award. Please be discreet when discussing winners or making critical comments as students or adult sponsors might overhear.