JUDGING GUIDELINES

The Roles of a Judge

The Judging role is multi-faceted. Judging is more than putting scores on paper. As a judge, you will step into a number of roles on judging day. Fulfilling all of these roles is important to a successful science fair. You may not fill all of these roles as a judge when interviewing a student, but through the morning, you will have the opportunity to exercise all of the roles throughout the judging experience.

Evaluator

The main role of a Judge is to evaluate the various projects in a category or division and assign them a score. This is usually done before the students arrive in the morning. You will first be evaluating the project based on what you see.

Facilitator

Later in the morning, you get to meet the students. You will still be evaluating the project, and you will also be a Facilitator, creating an open and positive atmosphere to allow the student to comfortably tell you about their project and the research that they did. This role is important because the quality of your facilitation will result in the amount of information you will receive to make an accurate evaluation of the project as a whole.

Counselor/Mentor

When a student asks you, "What could I have done better in this project?" you have then stepped into the role of a counselor. You can make a recommendation of what could have taken the project up to the next level of quality. It is better to let the students answer this themselves. Ask them if they've thought of the "next step" or a better procedure.

Motivator

An important role of a judge is to give the student some compliments that will make them feel good about their work and motivate them to compete again. The students have put in a lot of work to compete in the fair and should be complimented on that. The simplest compliment given to a student can spur them on to future success in life.

Role Model

Remember that when communicating with the students, you are in the role of the judge, a leader in the community, from business, government or academia. Your actions portray to the students what the science fair is all about. Take care in what you do and say in the presence of the students.

Intel ISEF-Affiliated Fair Judging Criteria

Intel ISEF provided the following tips and judging criteria as suggested aids in the judging process. The following points may be of value to you as you go out to review and score projects.

Judges

- 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. Look for evidence of laboratory, field or theoretical work, not just library research or gadgeteering.
- Judges should keep in mind that competing in a science fair is not only a competition, but also an educational and motivating experience for the students. The high point of the fair experience for most of the students is their judging interviews.
- Students may have worked on a research project for more than one year. However, for judging, ONLY research conducted within the current year is to be evaluated. Although previous work is important, it should not unduly impact the judging of this year's project.
- As a 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.
- Compare projects only with those competing at this fair and not with projects seen in other competitions or scholastic events.
- It is important in the evaluation of a project to determine how much guidance was provided to the student in the design and implementation of his or her research. When research is conducted in an industrial or institutional setting, the student should have documentation, most often the 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.
- Please be discreet when discussing winners or making critical comments in elevators, restaurants, or elsewhere, as students or adult escorts might overhear. Results are confidential until announced at the awards ceremony.

JUDGING GUIDANCE

If you believe a project was incorrectly placed into a category, contact the judging coordinator or a science fair board member immediately. The judging coordinatoror fair board member will see to it that the appropriate category judges are informed to judge the project. We want to assure that all projects are judged.

We are judging the following:

- The quality of the work done on a project in pure or applied science or mathematics by a middle school or high school student, and how well that student understands the project and the area in which he or she has been working. Only secondarily are we evaluating the physical display (except for the enrichment award judging).

- A project that involves laboratory, field, or theoretical investigation, and not just library research or the construction of equipment unless the construction involves a creative approach or original idea.

- A middle school or high school student's work, and not that of a Ph.D. candidate or professional scientist. Many judges tend to over react to 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.

- An exhibit as compared with the other exhibits in the same category, and not with exhibits seen elsewhere under other circumstances.

Remember we are here to help encourage children and to enrich the students' interest in science. Science fair is not the place for negativism. It is desirable to have a first place winner in each category, but circumstances may not lead to that result (i.e. few projects, very poor quality of projects, etc.).

If the judges do not feel that any project in the category deserves a first place, a second review is required. Immediately bring this to the attention of the judge coordinator for review.

CRITERIA (Points)

Exhibits are judged on the following basis:

	Individual	Team
Creative ability	30	25
Scientific thought/ Engineering Goals	30	25
Thoroughness	15	12
Clarity	10	10
Skill and neatness	15	12
Teamwork (team projects only)		16

Evaluation Criteria for Category Judging

The criteria and questions below are used by the Grand Awards Judges of the Intel ISEF and are suggested as a guide for your category judging. 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.

I. 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.

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

If an engineering project, 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?

HOW TO BE A GOOD SCIENCE FAIR JUDGE

Being a Science Fair judge is a rewarding experience. Your performance as a judge completely defines the science fair experience for a student.

The judging process is done in two distinct phases: first, you will review and assess the projects without the students being present. It is important to budget your time so that

you will familiarize yourself with each project in the category. Read the report, study the board, try to get an understanding of what the student was attempting in his project. The second phase of judging is the interview with the student.

THE INTERVIEW

The second portion of the judging period is intended to include discussions with the exhibitors. Begin this phase by introducing yourself as a judge and then ask the student, "Tell me about your project." Listen to the student without interrupting them. Save your questions until the presentation is complete. You are making a memorable impact on the lives of some very talented young people. For some students, you are the first professional they have ever met who does a science or engineering job for a living. Some students' perceptions of you could influence their career choices.

Here interviews are to allow an evaluation of the exhibitors understanding of the subject matter. Also, it should provide a better feel of the students actual participation and a measure of the assistance that the student may have obtained. The interview should also provide the student with the opportunity to benefit from the constructive comments of the judges. For those students that will be taking their projects to later fairs, these discussions may provide useful inputs for further study and improvements to their projects. For the general judging, the oral skills of the students are not being evaluated. The information is the important thing! Only the Enrichment Award judge (Best Presentation) will evaluate the oral skills of the exhibitors.

If the number of projects in a given category is large, it may be necessary for the judges to limit the time spent with each exhibitor. Rather than causing bruised feelings by having to cut off the discussion with an over zealous exhibitor, it would be desirable to indicate at the start of the interview that a time limit is necessary and why it is necessary. In the interest of meeting the judging schedule, for the categories that have a large number of projects, **strive to limit the interviews to ten minutes**.

JUDGING RESPONSIBILITIES

There are three different types of judges. Remember we are here to help encourage children and to enrich the students' interest in science. Science fair is not the place for negativism. They are: Major Category Judges, Grand Award Judges, and Enrichment Award Judges. Their responsibilities are detailed as follows:

Major Category Judges

Individual Judge

- Each judge should keep an accurate score sheet, judging each project in his category on a 100 point basis. The score sheet serves a dual purpose. In addition to allowing the individual judge to keep track of his scoring of the projects, the sheet is sometimes used by the Board to identify additional projects, that may not have won an award, but that may be selected to go to the regional fair. For this reason it is requested that the score sheets be turned in at the end of the judging.

- Each judge should sign off on every project he judges. A sign off card should be attached to each project. Please be sure to judge every project you are assigned in your category.

- While judging, each judge should keep in mind that his category group has a secondary responsibility to turn in to each Enrichment Award Judge at least one project, from each division which warrants that Enrichment Award judge's consideration. Know what the four Enrichment Awards are and jot down your choices to be considered by your group.

Category Group

- The primary responsibility of each group is to come together, after each judge has completed judging all the projects he has been assigned in his category, and as a group completes the "Category Group Judging Sheet". Each group will complete two group-judging sheets (i.e., one per division). This form should be completed and turned in to the judge coordinator as soon as possible.

- The First and Second place winners from all categories will be automatically recommended to participate in the Regional Science Fair held in Prince George's County. Please recommend any additional projects you consider suitable to sending to the next level of competition at PG County. The Category Group will also be expected to select projects to be recommended for entry to the Prince George's Fair.

- It should be noted that only two "Category Group Judging sheets" would be filled out per Major Category Group. The Category Group leader will do this. The group leader is arbitrarily chosen to be the first name listed for each category.

Enrichment Award Judges

It is important that you complete the judging in a timely manner. During the morning, hours scan the entire area and begin to zero in on a smaller number of projects that appear to be appropriate to your special award. Later in the morning as major category groups complete their work; they will have inputs to you, through judge coordinator. When you have decided on a winning project, please turn in the name to the judging coordinator.

Best use of Inexpensive Materials - The exhibitor has set up an exhibit in such a manner as to convey a scientific concept, investigation, or experiment using materials costing a minimum amount of money. Preferably, materials used would be of no expense to the exhibitor but would consist of items found around the house or yard and correlated in such a way as to show creativity, scientific knowledge, and awareness of the environment.

Best Teaching Aid - The project can be used as a learning device to illustrate a scientific, technological, or mathematical concept on the sixth through twelfth grade level. Students can use it individually or in small groups.

Best Presentation - This award is judged on the success of the exhibitor to clearly and concisely convey, by both verbal and visual methods, the hypothesis, investigation, results and conclusions included in his exhibit. Among the elements judged will be speaking technique, visual attractiveness and coherence of display, continuity and completeness of ideas presented, and the ability to hold the attention and interest of the judge.

Best Correlation of Data - This special award will be made in recognition of the student's skill in collecting scientific data and applying the data to verify a scientific theory or equation, or to support the conclusions made by the student because of his scientific investigation. The following aspects should be considered:

a. Data gathering technique:
   (1) Precision
   (2) Validity

b. Recognition by the student of limitations, which may affect the accuracy of the data:

   (1) Simplifying assumptions implicit in the data gathering method and data reduction methods.

   (2) Sources of error. The student should recognize possible sources of error and either make appropriate corrections or make allowances for them in the presentation of his data.

A precise and valid explanation of reasons for the deviation of data from expected results is a mark of sound scientific thought and will be given appropriate recognition.

Grand Prize Judges

The grand prize judges must choose one grand prizewinner from each division. You must restrict yourselves to only those projects that have won a first place in the Major Categories. Those names can be obtained from judge coordinator later in the morning as the category groups submit their results.

Additional Judging Guidance

Before starting to judge, take a quick walk-around of all of your assigned projects, to get a feel for what they are about, what they look like, and where they are located.

Read the backboard in some logical order; assess its impact, and how well it tells the "story" of the project. Were you able to understand quickly what the project is trying to do, and what the results were?

If equipment or devices are part of the display, do they serve an obvious purpose, based on what you have seen so far?

Read the abstract. Assess it. If missing, ask for it in interview.

Read the workbook (journal and/or full report). Assess it. (If missing, ask for it in interview.)

Write down your questions and compliments, for use in the Interview, and add to notes section of the judging form.

Sit during the interview process. It will be less intimidating to the student.

Record your scores on your score sheet.

Initial the judges' signature card at the project.

Remember not to "team-judge", but be sure to ask your Category Chair or another experienced judge if you have any questions during judging. Your scoring should be an independent evaluation of the project.

Once all projects are marked and interviewed:

a) Write down the rank order of the projects you have judged, based on your overall impressions of the day.
b) Which one is best?
c) Which should be at the bottom of the list?
d) Now check the total mark you have assigned to each project.
e) Is your impression consistent with the marks you've assigned? Decide if you need to review anything. Visit the project again if necessary.

Conveying Fairness

It is most important for you to show the students that you are both fair and knowledgeable. Your fairness is indicated by your actions:

- You spend about the same amount of time with each student
- You listen to the student's explanation of the project
- The questions you ask are intended to find out more about the project and how it was done -- *not* to embarrass or intimidate the student

This sounds simple, but can be challenging to implement.

Provide a good experience for the Competitors

As a judge, you can provide a good experience for the student competitors by using the following:

- Be Genuine
- Let the contestants show their stuff
- Encourage conversation

- Avoid value judgments
- Give one opportunity for improvement
- End meeting on a positive note
- Smile!

When with the students, there are things that you can do to make judging a learning experience for the students and an enjoyable time for you:

- Work to put students at ease, (Sit Down)
- Show you are interested
- Listen actively
- Give positive reinforcement to nourish self esteem (say what you like about project)
- If students are intimidated they will not speak freely
- Ask students about their Projects, not just what they did
- Ask students enough questions to satisfy yourself that they understood the project.
- When you have reached the student's knowledge limit, STOP asking questions
- Have one Positive Comment for every student
- Remember when you were 12 years old
- Let the student teach you something

SUGGESTED WORDING

To get the most out of the students, what you ask is just as important as how you ask it. The personalized sentence starters below are tools from Toastmasters International that when used in conversation aid in ease of communication. By blending in the following sentence starters into your conversation, you will find that both students and people in general will get you a more favorable response.

Personalize your language

- I liked….
- I enjoyed….
- I feel that…
- I see that…

If asked

- "I suggest…
- A technique I have used...
- The project would have more impact on me if...

THE ART OF THE JUDGING INTERVIEW: SAMPLE QUESTIONS

There are a number of questions that judges will ask as they gain experience in the judging process. These are some good sample questions that will spur on conversations if used during the judging process.

Use positive probing questions:

Probing questions are useful to stimulate the thought processes of the student.
One type of question to avoid is "Why didn't you do...?" The negative question is a sure way to destroy the students desires to engage in a dialog with you. It will put him on the defensive, making the interview process much more difficult. A better way to probe the students understanding is to ask a positive question. If you ask a question of this type, such as "Could you have done...?" or "What do you think would have happened if you had done..." When phrased this way the question is an invitation for the student to think about the experiment in a different way, and can turn the question into a positive experience.

- How did you come up with the idea for this project? Why did you decide to study this topic?
- What are your controlled variables?
- How accurate are your readings?
- What future applications can you see from the results of this project?
- What one outstanding thing did you learn doing this project?
- How would you improve this project if you would do it again? How long did it take you to build the apparatus?
- How did you build the apparatus?
- How much time (many days) did it take to run the experiments (grow the plants) (collect each data point)?
- How many times did you run the experiment with each configuration?
- How many experiment runs does each data point on the chart represent?
- Did you take all data (run the experiment) under the same conditions, e.g., at the same temperature (time of day) (lighting conditions)?
- How does your apparatus (equipment) (instrument) work?
- What do you mean by... (Terminology or jargon used by the student)?
- Do you think there is an application for this knowledge (technique)?
- Were there any books that helped you do your analysis (build your apparatus)?
- When did you start this project? Or, How much of the work did you do this year? (Some students bring last year's winning project back, with only a few enhancements)
- What is the next experiment to do in continuing this study?
- Are there any areas that we not have covered which you feel are important?
- Do you have any questions for me?
- (Note: these are only suggestions to keep the dialog going. You may find other questions to be more useful in specific interviews.)

GUIDING THE DISCUSSION

Sometimes we come across projects in technical areas with which we are intimately familiar, and the student just didn't get it -- they made some incorrect assumptions, missed a key indicator in the data, came up with a false conclusion, or didn't look at or understand some common principles. It can be tempting to share your knowledge about the topic, to help the student appreciate what happened (or should have happened) in the experiment. Some judges have been observed to enthusiastically pontificate while a student stood idly listening. Before you do this, please consider that these students are smart, and the next judge may hear the student parroting back the knowledge you

imparted. You may try with your questions to lead the student toward the right answers, but please don't give the answers. If you really feel compelled to make explanations, save them until near the end of the judging time when your knowledge will not be relayed to judges following you. Alternatively, you may give the student your card and invite future discussion about the project. Remember to be sure that your discussion meets the following Science Fair objectives to involve the student in discovery:

Your conversation should resemble a discussion with an esteemed colleague who is having difficulty with some research -- together; you talk through the situation to mutually arrive at improved answers:

- The student should be doing most of the talking;
- Coax and/or coach the student into realizing and describing the correct conclusions; it's the student's project, not yours;
- Encourage the student to conduct more experimentation in order to verify the new conclusions.

Improving Communication

Since you are a judge, most students instinctively think of you as an intimidating figure. The more you can dispel this image, the more likely you are to help the student be less nervous, and get a better discussion. Again, simple things can make a difference:

- Make eye contact with the student;
- If the student is short and you are tall, stoop, bend, or squat down to lower your eye level (if your knees won't allow this, ask to judge the Senior category); If possible sit next to the student while they stand to make the presentation. Think of how intimidating it must be for a 6th grader to make his pitch to an adult towering over him.
- Tip your head to the side a little to indicate interest (this is a universal nonverbal form of communication; even your dog does it);
- If you wear glasses, look at the student through them, not over the top of the frames;
- Whenever a student shows a good idea, clear craftsmanship, a clever way to get expensive results with inexpensive equipment, or anything you can compliment, be sure to use a compliment;
- Use a tone of voice that indicates interest or inquisitiveness, not skepticism or contempt.

In closing, HAVE FUN at Science Fair!