Judging Guide

How to Judge an Exhibit:

1. For each exhibit you are assigned, you should personally interview the student. This ensures a thorough evaluation of the student's exhibit. The exhibit by itself is never an adequate representation. Only by extensive questioning can you obtain a good grasp of what the student knows about the subject.
2. If the student is not present when you show up to judge the exhibit, please come back later to allow the student a fair chance to tell you about his/her exhibit.
3. The interview should be as personal and individual as possible. If another judge is interviewing the student when you arrive, please move on to another assigned exhibit or "hang back" and wait to avoid overwhelming the student.
4. Every interview should last 10-15 minutes. There is no substitute for careful consideration of the student and their exhibit. Even if a student is not in the running for a top award, they should be talked to for the educational experience involved. Ten minutes is a small amount of time for such an undertaking.
5. If you do not feel qualified to ask pertinent questions in a particular exhibit's field, use the opportunity to let the student divulge their background and knowledge of the subject. This should provide the information necessary to judge the exhibit properly.
6. As a lead into the interview, it is suggested that you introduce yourself, and ask the student to tell you about their exhibit. Specific follow-up questions will generally become apparent as they describe their project. The judging guidelines (criteria), listed on the following pages, are intended to help you identify and strengths and weaknesses of the exhibits.
7. Above all, remember our main goal is to encourage students to continue their interest in science and engineering. Therefore, be conscious of what you say and how you act towards the students. ***No matter how mature they may seem, they are still children, and full of insecurities!*** As a general guide, <u>treat them as if they were your boss' son/daughter</u>. Back in the judging room, you can be brutally honest. However, when you're face-to-face with them, be kind.

What are you Judging?

- The quality of the work done on the project in science, engineering or mathematics by a high school or junior 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.
- A project which involves laboratory, field or theoretical work and not just library research or gadgeteering.
- A high school or junior high school student's work, and not that of a PhD candidate or a professional.
- A project as compared with other projects in the same category, and not with projects seen elsewhere under other circumstances.

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Creative Ability

- Does the project show creative ability and originality in - the question asked? - the approach to solving the problem? - the analysis of the data? - the interpretation of the data? - the use of the equipment?
- Obviously, no project would be creative and original in all these aspects and, in addition, you must keep in mind that you are dealing with high school and junior high students. Thus, ask yourself whether something is creative and original in terms of a professional level or for a high school student. The latter is most probable, and means that it is very important to try to ascertain the nature of the assistance that the student has received.
- A student should not necessarily be penalized for receiving help from others (all professionals receive help to some degree in some way). Credit for creative ability and originality should be in regard to what the student has contributed and not for what others have done for him/her. For example, did the student get the idea for the project straight from a text or did the project come from the student's ability to combine various resource suggestions and his/her independent thoughts into a project.
- Other sources of aid for the project may be newly published textbooks, teachers, professionals and parents. A less sophisticated project that was the original plan of the student must be rated higher than a polished textbook project.
- Collections are not considered creative unless they are used to support an investigation and help answer a question in some original way. Construction of equipment which involves the assembly of a kit cannot be considered to be creative unless some unusual approach or design modification is used.
- For engineering, a clear distinction should be made between gadgeteering and a genuine contribution. A "Rube Goldberg" device may be ingenious, but if it is not really the most efficient way to solve a problem, or if it would not be acceptable to a potential user, or if it is unreliable in it's functioning, then it cannot really be considered to be a valuable creative contribution.
- Did the student research the project enough to be familiar with similar scientific projects or ideas?

Scientific Method & Engineering Goals

Scientific Method

- Is the problem stated clearly and unambiguously?
- Was the problem sufficiently limited so that it was possible to attack it? One of the characteristics of good scientists has been the ability to break complex problems into segments which can be studied. Simply working on a difficult problem without getting anywhere does not make much of a contribution. On the other hand, neither does solving a simple problem.
- Was there a procedural plan for obtaining a solution?
- Are the variables clearly recognized and defined?
- If controls were necessary, was there a recognition of their need and were they correctly used?
- Are there adequate data to support the conclusion?
- Are the limitations of the data recognized?
- Is the experiment repeatable? Would the same results occur?
- Does the student have an idea of what further research is indicated?

Engineering Goals

- Does the project have clear objective?
- Does the objective have relevance to the needs of the potential user?
- Is the solution - workable? - acceptable to the potential user? - economically feasible?
- Can the solution be utilized as part of another end product?
- Can the solution be incorporated into the existing systems which are already in place? Does the solution require a totally new support system? (Example: A helicopter in every house in the suburbs would require a vastly different or expanded system of aircraft control (and other aircraft support) than is in place today.)
- Does the solution represent a significant improvement over previous alternatives?
- Has the solution been tested? Will a refined solution hold up to use? Will it tolerate abuse?
- Does the student recognize the manner in which the solution will fail?
- Does the solution require a high degree of training to use?

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Skill

- Does the student have the skills required to do all the work necessary to obtain the data which support the project? Laboratory skills? Computation skills? Observational skills? Design skills?
- Where was the project done? What type of assistance was received from parents, teachers, scientists or engineers? Was the assistance guidance or problem solving?
- Was the project carried out under the complete supervision of an adult or did the student largely work on his/her own?
- Where did the equipment come from? Can (or could) the student use the equipment unaided? Does the student possess the operational understanding of the tools used in the project? Did the student build or borrow the equipment?

Documentation & Understanding

- Does the project carry out its purpose within the scope of the original aims?
- How completely has the problem been covered in the project?
- Are conclusions based upon data? Was enough data taken to support the conclusion?
- If it is the kind of experiment where notes were appropriate, how complete and adequate are the notes?
- Was adequate time devoted to the project? Were areas skipped or overlooked as time ran out?
- Does the student understand how the project ties in with related research?
- Does the student cite scientific literature, or cite only popular literature (newspaper, Reader's Digest, etc.)?

Presentation & Display

- How clearly is the student able to discuss the details of the project? Is the student able to explain the purpose, procedure and conclusions in a clear and concise manner? Watch out for memorized speeches with little understanding of the principles behind what is being said.
- Has the written material been expressed well by the student? Does the written material agree with the understanding expressed by the students oral presentation?
- Are the important phases of the project presented in an orderly manner?
- How clearly are the data presented?
- How clearly are the results presented?
- How well does the project display explain itself?
- Is the presentation done in a forthright manner, without cute little tricks or gadgets?
- Was the display done by the student or was assistance received from his/her art class or others?

Teamwork (Team Exhibits Only)

- Was the work spread among the team members?
- Did each do portions of the experiment and prepare portions of the exhibit?
- Can each team member talk about the total experiment/exhibit by themselves?
- Do they present the exhibit to you as a team would, does one talk as the others point out the detail being described?