JUDGING CRITERIA

We are judging the following:

-- The quality of the work done on a project in science, engineering or mathematics by a high school student, and how well that student understands the project and the area in which he 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 student's work, and not that of Ph.D. candidate or a professional. Sometimes judges tend to overreact to 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.

-- A project as compared with the other projects in the same category, and not with projects seen elsewhere under other circumstances.

CRITERIA

Exhibits are judged on the following basis:

Creative ability	30 points
Scientific thought/Engineering goals	30 points
Thoroughness	15 points
Skill	15 points
Clarity	10 points

For younger students, consideration should be given to the expansion of categories to provide additional avenues for success. Therefore, exhibits for Junior High entries will be judged on the following basis:

Creative ability	20 points
Scientific thought/Engineering goals	20 points
Thoroughness	15 points
Skill	15 points
Clarity	10 points
Dramatic Value	10 points
Personal Involvement	10 points

CREATIVE ABILITY (30 points)

1. 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 interpretation of the data?
   - -the use of equipment?
   - -the construction or design of new equipment?

Obviously, no project would be creative and original in all these aspects, and in addition, one must keep in mind that one is dealing with high school students. Thus, one must ask 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 be penalized for taking help from others (all professionals receive help to some degree in some way). But credit for creative ability and originality should be in regard to what the student himself has contributed, and not for what others have done for him.

For example, did a student get an idea for their project from a textbook suggestion for research, or did he develop the idea himself as a result of reading or work that they had done? If they developed the idea themselve, it would be considered more creative.

A warning to judges would be made at this point. There have been projects which had elements in them which judges thought were original, but which actually came out of textbooks or laboratory manuals in newly developed curricula with which they were unfamiliar. This possibility should be kept in mind.

Another source of help which should be evaluated is that received from a teacher or other adult. A student may have a very original approach for solving a problem, but it may have come out of suggestions made by a scientist or engineer with whom they worked during the summer. This idea must be compared with something less sophisticated, but which came genuinely from the work or thinking of a student. The latter would be considered more creative.

2. Collections cannot be considered to be creative unless they are used to support an investigation and help to 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 is used.

3. 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, it is not acceptable to the potential user, if it is unreliable in its functioning, then it cannot really be considered to be a valuable creative contribution.

Scientific Thought:

1. Is the problem stated clearly and unambiguously?

2. Is the problem sufficiently limited so that it was possible to attack it? One of the characteristics of good scientists has been reported to be the ability to identify important problems that are capable of solution. Simply working on a difficult problem without getting anywhere does not make much of a contribution. On the other hand, neither does solving a very simple problem.

3. Was there a procedural plan for obtaining a solution?

4. Are the variables clearly recognized and defined?

5. If controls were necessary, was there a recognition of their need, and were they correctly used?

6. Are there adequate data to support the conclusions?

7. Are the limitations of the data recognized?

8. Does the student understand how his project ties in with related research?

9. Does the student have an idea of what further research is indicated?

10. Did the student cite scientific literature, only popular literature (local newspaper, etc.)?

Note: It should be pointed out again that the student may have received assistance, and that is important to estimate the extent of this assistance, and what contribution it made to the project.

Engineering Goals:

Note: We have not had much experience in applying these criteria to student projects, and so judges are urged to use them as guidelines only. Remember, we are judging among the exhibits in the ISEF, and not against engineering projects done by professional engineers.

SCI

1. Does the project have a clear objective?
2. Does this objective have relevance to the needs of the potential user?
3. Is the solution
   - workable? Unworkable solution may be interesting but are of no value from a practical point of view.
   - acceptable to the potential user? Solutions which will be rejected or ignored are of no value
   - economically feasible? A solution so expensive that it cannot be utilized is of no value
4. Can the solution be successfully utilized in design or construction of some end product?
5. Does the solution represent a significant improvement over previous alternatives?
6. Has the solution been tested to see if it will perform under the conditions of use? (This may be difficult for many students, but it should at least be considered).

THOROUGHNESS (15 Points)

1. Does the project carry out its purpose to completion within the scope of the original aims?

2. How completely has the problem been covered in the project?

3. Are the conclusions based on a single experiment, or on replication?

4. If it is the kind of project where notes were appropriate how complete are they?

5. Is the student aware of other approaches or theories concerning his project?

6. How much time was spent on the project?

7. Is the student familiar with the scientific literature in the field in which he was working? Note: Citations are not considered to be an important consideration in engineering (as opposed to science) and so a student should not be penalized for a lack of citations.

SKILL (15 Points)

_____1. Does the student have the skills required to do all the work necessary to obtain the data which support his project? Laboratory skills?Computation skills? Observational skills? Design skills?

2. Where was the project done? Home? School laboratory? University laboratory? What assistance was received from parents, teachers, scientists, or engineers?

3. Was the project carried out under the supervision of an adult, or did the student work largely on his own?

4. Where did the equipment come from? Did the student build it himself? Was it obtained on loan? Was it part of a laboratory in which he worked?

CLARITY (10 Points)

_____1. Is the student himself able to discuss the project? Is the student able to explain its purpose, procedure and conclusions in a clear and concise manner? Discount a glib tongue but try to make allowances for nervousness which may result from talking to an authority. Try to watch out for memorized speeches with little understanding of principles.

2. Has the student expressed themselves well in written material? Remember that such material could have been prepared with the assistance of another person.

3. Are the important phases of the project presented in an orderly manner?

4. How clearly are the data presented?
5. How clearly are the results presented?

6. How well does the project display explain itself?

7. Is the presentation done by the student, without cute tricks or gadgets?

8. Was all work done by the student, or did he receive assistance from his art class or others?

Judges Conduct

When interviewing, judges should remember that the Fair is not only a competition--it is also an educational and a motivating experience.

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 Fair.

As a general rule, the judge represents professional authority to the student he is evaluating, and therefore, it is imperative that the judge conduct themselves in an appropriate manner. The way in which questions are asked, suggestions offered, and constructive criticism made should always be in a tone which will provide definite encouragement for continued effort.

The judge must never tear down, treat lightly, or display boredom toward projects they personally considers unimportant. Always give credit to the individual for having expended the effort necessary to present and prepare a project which was sufficiently better than the others in their own home Fair to be chosen to come to the ISEF.

Warning:

Be careful about any comments in elevators, restaurants or elsewhere about judging. The students, as well as their as their adult escorts, are naturally very interested in the judging decisions, and we do not want word to get out ahead of time. We also do not want students to overhear any critical comments that judges might make to each other.

The same care should apply to written notes or comments that you might have. Don't leave them in the exhibit area in any place where they might be found.