

I) Creative Ability (Individual-30 points, Team-25 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 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 and junior high school students. Thus, one must ask whether something is creative and original in terms of science, or for that level student. The latter is more 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 scientists receive help to some degree). But 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.

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

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

Another source of help, which should be evaluated, is that received from a teacher or a scientist. A student may have a very original approach for solving a problem but it may have come out of suggestions made by a scientist with whom he 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.

IIa) Scientific Thought (Individual-30 points, Team-25 points)

For an engineering project, or some projects in categories such as computer science and mathematics, 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).

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

IIa) Engineering Goals (Individual-30 points, Team-25 points)

- 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 points, Team-12 points)

- 1) Was the project carried out to completion within the scope of the original work?
- 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 points, Team-12 points)

- 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 points, Team – 10 points)

- 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 principals.
- 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?

JUDGING CRITERIA

What are we judging?

We are judging the following:

- The quality of the work done on a project in pure or applied science 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 investigation, and not just library research or the construction of equipment unless the construction involves a creative approach or original idea.
- A high school or junior high school student's work, and not that of a Ph.D. candidate or a professional scientist. Sometimes judges tend to overreact 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.
- A project as compared with the other projects in the same category within the same fair, and not with projects seen elsewhere under other circumstances.
- **Projects with individual interviews should not be judged by a group of judges but by each judge separately and independently.**

CRITERIA

Exhibits are judged on the following basis:

	Indiv Points	Team Points
Creative Ability	30	25
Scientific Thought OR Engineering Goals	30	25
Thoroughness	15	12
Skill	15	12
Clarity	10	10
Teamwork	---	16
TOTAL	100	100