**Things to Consider When Judging**

We are judging the following:

* The quality of work done on a project in science, technology, engineering, or mathematics by a student, and how well that student understands the project and the area in which they have been working. Only secondarily are you evaluating the physical display.
* A project, which involves laboratory, field, or theoretical work, and not just library research or gadgeteering.
* A age appropriate student’s work, and not that of a Ph.D. candidate or a professional. 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 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

**CREATIVE ABILITY (30 POINTS)**

Is this an original idea or is it an original approach to an idea? Both are good. Does the student show ingenuity in the materials, apparatus, and techniques used? Does she/he buy all materials or does she/he show the ability to improvise? Kits are not considered to be original. Does the exhibit catch and focus the attention of the viewer? No consideration will be given to the display portion of a project that is obviously expensive, where the display stands out because of expense rather than the student’s ingenuity.

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 students. Thus, one must ask whether something is creative and original in terms of a professional level, or for a 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 has contributed, and not for what others have done.

For example, did a student get an idea for his project from textbook suggestions for research, or was it developed from an independent idea. The independent idea would be considered more creative. A warning to judges should be made at this point. Don’t let sophistication AUTOMATICALLY discredit a students’ work. Nicolet’s research program supports professional research mentorship. Some students embrace the opportunity and commit significant amounts of time to graduate level research. Still, the student(s) is responsible for convincing the judge of significant independent creative contribution.

2. Collections cannot be considered to be creative unless they are used to support an investigation to 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 unusually 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, if 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/ENGINEERING GOALS (30 POINTS)**

Does the exhibit show some of the following: organizedprocedures, accurate observation, controlled experimentation, or a cause and effect reasoning, theories, and differences. Give weight to probable amount of real study and effort, which is represented in the exhibit. Make certain the project is not just a demonstration or an attractive display.

1. Is the problem stated clearly and unambiguously?

2. Is the problem sufficiently limited so that it was possible to critique? One of the characteristics of good scientists is the ability to identify important problems that are capable of a solution. Simply working on a difficult problem without a clear pathway to solution is poor science.

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 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 understandhow his project ties in with related themes?

9. Is there a reasonable connection between required background/library research and the experiment?

10. Were International Units (metric) used?

11. Was the data clearly quantitative?

12. Was the data analyzed for significance using statistics?

**THOROUGHNESS (15 POINTS)**

Howcomplete has the problem been explored? Look for evidence recorded in logbooks, bibliographies, graphs, and charts. Also look for evidence of appropriate certification if the project is using restricted or controlled materials,

1. A logbook is required; it should be a permanently bound book and entries shouldbe in ink. The logbook must contain data entries and may contain research notes, thought summaries, etc.

2. Was adequate time spent?

3. Was the project challenging enough to qualify as a major school assignment?

4. Was the literature review complete or superficial?

5. Were there enough experimental trials completed … enough samples per trial?

6. Obvious time spent on backboard?

**SKILL (15 POINTS)**

In their quest for a complete experiment, did the student demonstrateahigh level of skill? This category of evaluation ties in closely with thoroughness*.* Generally, a student who is thorough will also show a high degree of skill. Nonetheless, check for:

1. Exceptional workmanship with an experiment.

2. Attention to detail

3, Accurate measurement were significant figures used in calculations?

4. Were graphs labeled?

5. Stability of the display board.

6. Quantitative vs. qualitative data collection (quantitative data was stressed).

7. Was an effort made to include support display material, ie: mock experimental set-up, the engineered device, unique equipment used, etc.

**CLARITY (10 POINTS)**

Does the display explain what the student attempted to do, what she/he did, how she/he did it,and what results were achieved? Does the explanation on the display board follow logical sequence? Things which ensure clarity are, guide marks, labels, descriptions, and proper emphasis on important items. The same type of clarity should be present orally. Ability to communicate is a crucial scientific skill.

1. Does the display board explain the key elements to the research?

2. Is there a logical layout of information on the display board?

3. Does the person speak loudly enough? Is their vocabulary clear?

4. Are there pictures?