

Some Thoughts on the "Art" of Judging

(The following information has been compiled, by permission, from the SC/SW Minnesota Regional Science & Engineering Fair, Mankato, Minnesota "Handbook for Judges" which is based on an article written by Ronald N. Giese, Richard J. Rezba, and Julia H. Cathron, published in Science Scope, October, 1989.)

THE STUDENT INTERVIEW

In some science fairs, the students are not present when the judges review their projects. Judges must base their decisions solely on the project display. We find that format leaves much to be desired. Our students will be present; therefore, you will have the benefit and responsibility of talking with each of the student experimenters in the section to which you are assigned.

Inexperienced Presenters: For many students this will be their first experience as a presenter. It will be an important lesson in public speaking for every one of them. Students will have the added pressure of performing in front of or at least within earshot of friends and classmates, most of whom they are sure have better projects than they do. Knowing they placed in their school science fair isn't much comfort now; this regional fair is big time, major league competition.

Your Image: You, as a judge, will be a bigger-than-life adult--and the younger the students, the bigger you will appear to be. You have a badge that says JUDGE. To the students, you are super smart and a scientist of one sort or another. Their experience with you can and should inspire emotional as well as intellectual growth.

Allotting Time: Before you begin to interview the students, determine how much time you have to talk to each, and then stay with your schedule as much as possible.

Questioning the Students: When you question the student, give them plenty of time to think. If a presenter appears confused after a pause of a few seconds, rephrase your question. Be patient and resist any urge to dazzle them with your brilliance.

Your questions may not always elicit an immediate response, but they will stimulate thinking. Over the years, as judges and as teachers, we have frequently had students approach us after the competition to say, "I was thinking about your question, and..." Students may not always think as fast as we would like them to, but they are thinking.

Presenters should be able to describe their work in detail. However, they should not be expected to provide a textbook definition for any and all associated terms. If you think the term is central to the student's work, go ahead and probe, but be ready for examples rather than definitions. Expect such statements as, "Oh, you mean like when..."

No Losers: Good judges challenge every student to meet high standards with all the rigor that each individual can take. Watch students' lower lips and eyes for signs that it is time to back away. Please end

each interview with a smile and an encouraging comment. Remember there are no losers at this event, only winners. The losers are those who did not try.

THE PROJECT

Controls: Do not assume that just because something is called a control, the student can define the concept or tell why a control is necessary. If a student cannot identify, define, and state the importance of any component, ask him or her to find out what the missing or undefined component of the experiment is and why it is important.

Confounding Variables: Watch for confounding variables such as the use of personal friends or pets as subjects. Also watch for students using themselves as evaluators of the differences between experimental and control groups.

Some students cannot comprehend the idea of unintentional bias; others may not have had an alternative. Questioning related to the possibility of unintentional bias, especially in themselves, may be interpreted as a reflection of or even an attack on the student's honesty. Probe, but do not press for maturity that is not there.

Not Enough Subjects/Variables: Many young students design experiments using too few subjects in their experimental and control groups. Where appropriate, help them see the need for increased sample sizes. By your questions and comments, help students to understand that negative results are just as important as positive findings. Data that rejects an original hypothesis is as meaningful as data supporting it.

As a scientifically literate adult, you frequently think in terms of three or more variables, or even several whole sets of variables at once. Such a feat is beyond the intellectual maturity of many students. They may well be limited to reasoning that involves a maximum of two simple variables. When they are considering their independent and dependent variables, they may not have the maturity to simultaneously consider the effects of any other variables on their project.

POTENTIAL PROBLEMS

Watch your notes as you move around. Some students will stand on their heads to read them. Limit your discussion of students and their projects to the judges' conference room.

Who Gets First Prize? It is in the total confidentiality of the judges' conference room that student projects should be dissected, critically analyzed, and rank-ordered. Speak out! Keep your standards realistic for this age group, but keep them high. Sometimes in an area with few entries, even the best project has serious problems. Does it still get first prize? (World records are not set in every race, yet winners are announced.)

On the other hand, imagine being a student and knowing that there were only two entries in your category and you got 3rd place. Such a put down discourages participation; it does not encourage excellence.

Cost Versus Quality: Money talks. It buys expensive materials to be used in projects and displays. Judge projects and displays on their content and clarity of message, not on their cost. The student who used inexpensive materials ingeniously should be rewarded for good design, not poverty, while the more affluent student should be neither penalized nor rewarded for having been spared the need to improvise.

Is it the Student's Own? Another perennial problem is deciding how much of each project is the student's own work. When the student does not know what the project is about, the decision seems easy. Be sure, however that you are not mistaking nervousness or shyness for ignorance. You will be asking trembling neophytes to think individually about the implications of their projects. It is a relatively new experience for them to think on their feet, especially in front of several adults and six peers craning their necks to hear as much as possible.

Other projects will seem too sophisticated to be the work of a student of the age you are interviewing. That hunch merits further questioning, but not a conclusion. Some students are extremely bright. Others have helpful parents who will spend hours ensuring that their children have all the resources and contacts they need. You must distinguish between the student with resources who used them with comprehension and the student who just used them. Although child prodigies do exist, it is unlikely that ten of them will be placed side-by-side in the section you are judging. Your task is to make sure the real scholars are recognized. When you come across a project that is obviously the work of a student and yet original, simple, well-conceived, clearly displayed, and well-understood, you have a winner.

QUESTIONS JUDGES SHOULD ASK

- Why did you decide on this topic?
- What is the purpose of your project?
- What is your hypothesis?
- Which variable did you change?
- For each value of the variable that you changed (the independent variable), how many trials did you do?
- What response did you observe or measure?
- What are some of the things you were careful not to let change (the constants) as you did the experiment?
- What procedures did you follow?
- In your experiment, what was the control? What sample did you use to compare the others against?
- What results did you find?
- What conclusions did you draw?

- How did your results relate to your original hypothesis?
- If you had a mentor, in what ways did your mentor assist you?
- In doing your library research, what related research did you find that was helpful to you in conducting your project?
- What would you do differently if you were to do the project again?
- What might you do in the future to continue your project?

One type of question to avoid is "Why didn't you do....?" Probing questions are useful to stimulate the thought processes of the student. A solution or extension to the work presented may be obvious to you with all of your years of experience, but the student may not understand why you're asking such a question. If you ask a question of this type, be sure to imply the correct intent, as in "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.

Additional Suggestions Regarding the Student Interview

(The following is taken, by permission from the California State Science Fair "How to be a Good Science Fair Judge" web site at <http://www.usc.edu/CSSF/>.)

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.