**How to be a Good Science Fair Judge**

 **Interview with the Student**

 A genuine interest in each student's work, coupled with the determination to make judging a positive learning experience, is a good formula to use here. The interview a) allows students

 to present their work in their own way, b) permits the judges to, by asking specific questions, review the work done and determine the student's understanding of the field and c) encourages verbal communication between exhibitors and judges. Ideally, students will be well organized, familiar with their field of study, relatively composed, courteous and eager to learn. Please remember, however, that for many young students this is their first experience in a pressure situation. The importance of a positive approach cannot be over-emphasized. Your own maturity will prove a valuable tool in drawing out theirs.

**Asking Questions**

Your best tool in judging is your ability to ask questions. Be sensitive to what the student knows. You can always ask questions that the student can answer, and keep a conversation going for ten minutes. There are some questions all students should be able to answer, including variations on:

* How did you come up with the idea for this project?
* What did you learn from your background search?
* How long did it take you to build the apparatus?
* How did you build the apparatus?
* How much time (many days) did it take to run the experiments (grow the plants) (collect each data point)?
* How many times did you run the experiment with each configuration?
* How many experiment runs are represented by each data point on the chart?
* Did you take all data (run the experiment) under the same conditions, e.g., at the same temperature (time of day) (lighting conditions)?
* How does your apparatus (equipment) (instrument) work?
* What do you mean by (terminology or jargon used by the student)?
* Do you think there is an application in industry for this knowledge (technique)?
* Were there any books that helped you do your analysis (build your apparatus)?
* When did you start this project? or, How much of the work did you do this year? (some students bring last year's winning project back, with only a few enhancements)
* What is the next experiment to do in continuing this study?
* Are there any areas that we not have covered which you feel are important?
* Do you have any questions for me?

(Note: these are only suggestions to keep the dialog going. You may find other questions to be more useful in specific interviews.)

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.

**Guiding the Discussion**

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. Remember to be sure that your discussion meets the following Science Fair objectives to involve the student in discovery:

* Your conversation should resemble a discussion with an esteemed colleague who is having difficulty with some research -- together, you talk through the situation to mutually arrive at improved answers;
* The student should be doing most of the talking;
* Coax and/or coach the student into realizing and describing the correct conclusions; it's the student's
* Encourage the student to conduct more experimentation in order to verify the new conclusions.

**Improving Communication**

Since you are a judge, most students instinctively think of you as an intimidating figure. The more you can dispel this image, the more likely you are to help the student be less nervous, and get a better discussion. Again, simple things can make a difference:

* Make eye contact with the student;
* Tip your head to the side a little to indicate interest (this is a universal nonverbal form of communication; even your dog does it);
* Whenever a student shows a good idea, clear craftsmanship, a clever way to get expensive results with inexpensive equipment, or anything you can complement, be sure to use a compliment;

Many of these students are exceptionally bright, and it is easy to think -- when facing an incredibly impressive display and a supremely confident student -- that this student's research is beyond your knowledge. If a project is really and truly completely outside your experience, you are still knowledgeable in the area of problem-solving and the scientific method. Concentrate on these aspects rather than the details of a particular project.

**Scoring Student Projects**

When you are scoring student projects, you can use a few simple criteria for selecting the winners:

* The quality of the student's work is what matters, not the amount of work;
* Team projects are judged like other projects -- it is the quality of the work that matters (an individual project of equal quality to that of a team project may be ranked higher because of the comparatively greater effort required by the individual);
* A less sophisticated project that the student understands gets higher marks than a more sophisticated project that is not understood;
* Access to sophisticated lab equipment does not guarantee a high quality;
* It's okay if the student ended up disproving the objective or hypothesis of the experiment.

High marks go to:

* Genuine scientific breakthroughs
* Discovering knowledge not readily available to the student
* Correctly interpreting data
* A clever experimental apparatus
* Repetitions to verify experimental results
* Predicting and/or reducing experimental results with analytical techniques
* In engineering categories, experiments applicable to the "real world"
* Ability to clearly portray and explain the project and its results

Low marks go to:

* Ignoring readily available information (e.g. not doing basic library research)
* An apparatus (e.g. model) not useful for experimentation and data collection
* Improperly using jargon, not understanding terminology, and/or not knowing how equipment or instrumentation works
* Presenting results that were not derived from experimentation (e.g. literature search)

Although the most obvious reason for your being a judge at the Science Fair is to assist

In selection of the projects that get prizes, the good judge knows that this is an important experience in the life of every participant. Please do your best to make sure that all of the participants remember the Science Fair as a positive experience in their lives.

**Key Elements of a Science Fair Project**

**Notebook**

Every project should have a notebook, a detailed written record of the scientific study.

The contents should be specific and concise and should display the student's use of the scientific method. Among its contents should be an Abstract, Hypothesis (or, in the case of engineering and computer projects, Statement of Goals), Procedures (showing sufficient repetition of tests/experiments), Results, Conclusions, Recommendations, Bibliography and An Appendix (tables, figures, raw data). Additional sections may include an Introduction, Background Information, Nomenclature, Statement of Theory, Statistical Analysis and other topics specific to the individual project. Although you will not be able to thoroughly examine every notebook, you will find it helpful to check the contents at least briefly.

**Display/Backboard**

The display is essentially a compromise of content versus time. Ideally, it should stand on its own, describing the major elements of the project and should be easily read from 3 feet away. If logically and neatly organized, it should require no more than sixty seconds reading

time. While appropriate graphs, photographs, illustrations and equipment displays are encouraged, gimmicks (e.g., flashing lights) are not. If, after reviewing the display, you feel confused rather than hungry for more, it has not served its primary purpose -- but keep in mind that it is only a small part of the overall project.

**The Overall Project**

A display may be dazzling, the notebook neat and well written and the interview eloquent

but, if the basic project idea (the question to be answered or the problem to be solved) and method of answering or solving it won't fly, the student has not become a better scientist or engineer by doing the project. A review of the Judging Criteria on the score sheet available at the fair should prove useful in evaluating the overall project.