HOW TO BE A GOOD SCIENCE FAIR JUDGE

The role of a science fair judge is challenging, but it is a very rewarding and worthwhile effort. As a science fair judge, you are given the unique opportunity to impact the lives of some very talented young people. Consider this – for many of these students, you may be the first professional they have ever met who is engaged in a science or engineering job for a living. You are an ambassador for your profession. You may very well influence their career choices.

Meeting the Student

When you first approach a student, please do in a friendly professional manner. Be sure to introduce yourself, explain your affiliation and offer a brief description of your background. While there is no set time you must spend in your evaluation process, most judges will meet with each student/project on an average about 20-30 minutes. In some cases, however, at his/her discretion, a judge may determine that spending more time with a student/project would be beneficial.

Conveying Fairness

As a judge, it is most important to show the students that you are fair and knowledgeable. Your fairness is indicated by a few simple actions:

- Spend about the same amount of time with each student/project
- Listen carefully to the student's explanation of the project
- Find out more about the project and how it was done. The questions you pose should not embarrass or intimidate the student. This sounds simple, but often times can be challenging to implement.

Asking Questions

The 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. Some example questions/variations all students should be able to answer:

- 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 did it take you to run the experiments?
- 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 under the same conditions?
- How does your apparatus work?
- Do you think there is an application in industry for this knowledge/technique?
- Were they any books that helped you do your analysis?
- When did you start this project?
- What is the next experiment to do in continuing this study?
- Are there any areas that we have not covered which you feel are important?
- Do you have any questions for me?

Type of Question to Avoid

"Why didn't you…?" 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 because of your years of experience, but the student may not understand why you are 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 phrasing 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 did not get it – they made some incorrect assumptions, missed a key indicator in the data, came up with a false conclusion, or did not 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 the 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 answer, but you should not provide the answers. If you really feel compelled to make explanations, save then until near the end of judging time when your knowledge will not be relayed to judges following you. Alternately, 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 do most of the talking
- Coax and/or coach the student into realizing and describing the correct conclusions and remember, it is the student's project, not yours
- 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 engage in a better discussion. Again, simple things can make a difference:

- Make eye contact with the student
- If the student is shorter than you, try to stoop, bend, or squat down to lower your eye level
- Tip your head to the side a little to indicate interest (this is the universal nonverbal form of communication; even your dog does it!!)
- If you wear glasses, look at the student through tem, not over the top of the frames
- Whenever a student shows a good idea, clear tables/graphs, a clever way to get expensive results with inexpensive equipment, be sure to use a compliment.

- Use a tone of voice that indicates interest or inquisitiveness, not skepticism or contempt

To assure the perception of fairness, you also need to make sure that one student does not monopolize your time. Some have a well-rehearsed pitch that may prevent you from having a chance to interact with the student. You have to find some way to break the pattern, and again, your tool is questioning. Politely interrupt with a question, usually in the form of "I'm sorry, I did not quite catch the relationship between that adjustment and this result, "or even some of the "any student can answer" questions, like "How many times did you run the experiment with each configuration?" and "How many experiment runs are represented by each data point?" The idea is not to stop the student from talking, but to get the student to interrupt the tape recording and think about what is being communicated to you.

Many of these students are exceptionally bright. 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 of 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.

Young people have largely developed their conversation techniques through their interactions with other young people. The y tend to actively converse on topics they are most knowledgeable about. When teenagers are faced with a discussion they do not grasp, they typically lose interest and look bored. If you keep appearing to be interested, no matter what is said, the student will assume you grasp what is going on. When you ask questions, even the "any student can answer this" type of questions, the student assumes you have kept up with the discussion and are maintaining an interest in their work. You may be struggling during the student's whole pitch to come up with something, anything, to ask that does not sound completely ignorant, but the student does not know how little of the information makes sense to you. Keep asking questions until it does make sense. Remember, you are not the only judge who will talk to this student.

While it is highly unlikely, there is always the possibility that an "imposter project" makes it to the state science fair level of competition. However, because of the judges' expertise, the questionability of project can be determined by simply asking for explanations of words that the student uses. Never assume the student knows what the technical terms mean or what a piece of equipment does, how it works, or why it was used. Enter into one of these discussions with the attitude that, if the student cannot explain it to your satisfaction, then the student really does not understand the science of what is going on. Chances are, if it does not make sense to you, it just does not make sense.

Scoring the Projects

When you begin to deliberate on the projects, you can use a few simple criteria for your decisions:

- The quality of the student's/students' work is what matters, not the amount of work
- Team projects and individual projects are judged the same – it is the quality of work that matters
- 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 and endorsements from professionals do not guarantee a high quality project

- It is acceptable if the student ended up disproving the objective or hypothesis of the experiment

High Marks go to:

- Genuine scientific or engineering 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
- Ability to clearly portray and explain the project and its results
- In engineering categories, experiments applicable to the "real world"

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 assessment of the entered projects, a 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.

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