What is a Science & Engineering Fair Judge?

Judging the Northeast Georgia Regional Science & Engineering Fair is a commitment worth the effort, and we hope this information makes your experience enjoyable and rewarding. Judges make a memorable impact on the lives of very talented young people while encouraging their efforts. For some students, you are the first professional they have ever met who "does" science or engineering for a living. We ask that you view part of your "job" at the Science Fair as an ambassador for your profession. Students' perceptions of you can influence their career choices, so we believe it is beneficial to introduce yourself and describe your background as you meet students.

Fairness

As a judge, it is essential to show the students that you are fair, impartial, and knowledgeable. This can be indicated through a few simple actions:

- You spend about the same amount of time with each student.
- You listen to the student's explanation of the project.
- Your questions asked are intended to find out more about the project and how it was completed -- *not* to call out an error in a way that could embarrass or intimidate the student.

Asking Questions

Your best tool in judging is your ability to ask questions. Be sensitive to what the student knows and their division, Junior or Senior. You can always ask questions that the student can answer and keep a conversation going for ten minutes. These 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 your 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, but the student did not understand. They may have 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. You may try with your questions to lead the student toward the right answers, but please don't give the answers. Remember to be sure that your discussion meets the following NEGA Science & Engineering 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 project, not ours;
- 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);
- If you wear glasses, look at the student through them, not over the top of the frames;
- Whenever a student shows a good idea, clear chartsmanship, a clever way to get expensive results with inexpensive equipment, or anything you can compliment, be sure to use a compliment;
- Use a tone of voice that indicates interest or inquisitiveness, not scepticism or contempt.

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.

Young people have largely developed their conversation techniques through their interactions with other young people. They tend to actively converse on topics that they are most knowledgeable about. When teenagers are faced with a discussion they don't 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's 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 doesn't sound completely ignorant, but the student doesn't know how little of the information makes sense to you. Keep asking questions until it does make sense. No matter how you handle this situation, please do not tell the student how little you understand (we don't want a student to tell a parent that the judges didn't know anything about the topic). Remember, you are not the only judge who will talk to this student. If something is not completely clear, bring it up in the judging meeting; judges who are familiar with the applicable science will have sorted it all out.

At the other extreme, a few projects are "snow jobs" that make it to the NEGA Regional Science & Engineering Fair. Sometimes you can identify these by simply asking for explanations of words that the student uses; don't assume the student knows the technical terms. They may also not know what a piece of equipment does, how it works, or why it was used. Go into one of these discussions with the attitude that if the student can't explain it to your satisfaction, then the student really doesn't understand the science or engineering of what's going on. Chances are if it doesn't make sense to you, it doesn't make sense. Of course, as with all questions or concerns that arise, discuss these projects during the judging session; there will probably be others on your panel with similar reservations.

Scoring Rubrics & Divisions

There are two divisions in the science and engineering fair. The Junior division is reserved for middle school projects in grades 6, 7, and 8, with the Senior division housing high school projects. Projects in both divisions are subdivided into either science or engineering and scored accordingly.

Judging Schedule

Judges will receive their assigned projects on January 28th at orientation.

7:45 AM – 8:00 AM	**Judges Check-in, Coffee, Snacks** *Judges Room in Commons*
8:00 AM – 8:30 AM	**Orientation** *Judges Room in Commons*
7:45 AM – 8:20 AM	**Student Check-in & Project Set up** *Commons Gym*
8:30 AM – 10:00 AM	**Phase I – Judging without Students** *Commons Gym*
8:30 AM – 10:00 AM	**Student Presentation 1** *Swanson Main Stage*
8:30 AM – 10:00 AM	**Student/Parent Post-Secondary Preparedness Presentation** *Swanson*
10:00 AM – 12:00 PM	**Phase II – Student Interviews** *Commons Gym*
12:00 PM – 1:15 PM	**Lunch Available** *Commons Banquet Rooms*
1:15 PM – 2:15 PM	**Phase III – Selection of Awards** *Swanson Main Stage*

Scoring Considerations

- 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 and endorsements from professionals do not guarantee a high-quality project (Did the student understand what was going on?);
- It's okay if the student ended up disproving the objective or hypothesis of the experiment.

High marks go to:

- Unique engineering prototypes
- 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 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 not derived from experimentation (e.g., literature search)

Although the most apparent reason for being a judge at the Science Fair is to assist in selecting projects that move to the Georgia State Science & Engineering Fair, the good judge knows that this is a milestone in every participant's life. Please do your best to make sure that all of the participants remember the NEGA Regional Science & Engineering Fair as a positive experience in their lives. Know how appreciative we

are for your willingness to serve these students and teachers in such an important endeavor.