# EISEF Judging Guide

## How to Judge an Exhibit:

- Your **goal** as a judge is to encourage the students to stay interested in science and engineering.
- Your **job** as a judge is to interview each student at their exhibit. You evaluate their project based on what the student tells you, as supported by the data in their exhibit. You then condense your evaluation into a **score** and helpful **comments to the student**.
- You may think a project is **terrible**: maybe it's poor, the student is surly or inarticulate, or it just doesn't interest you. Your **goal** is to encourage even these students; so be kind, keep your opinion to yourself, and try to give the student a good interview anyway.
- Plan to spend 10-15 minutes on each interview. Please don't skimp, even if you think the project is terrible. The students came to EISEF to be interviewed; they find good interviews encouraging—which is your **goal**.
- If the student is not there when you visit their exhibit, go interview another student, and return later.
- If another judge is interviewing the student when you arrive, please don't join the interview—that might overwhelm the student. Go interview another student, and return later, when your interview can be personal and individual.
- To start the interview, introduce yourself and ask the student to tell you about their project. As they do so, you'll think of specific follow-up questions to ask..
- Use the Judging Criteria on the following pages (and on the Judging Score Sheet) to steer the interview. They tell you how to identify the strengths and weaknesses of the project—and how to score it.
- If the project is outside your expertise, so you're not sure what to ask—just ask the student to give you some background on the project. If the student can do this at all well, it should inform you enough to start asking your own questions.
- When you end the interview, be sure to sign the Safety & Standards Acceptance Certificate to show that you interviewed the student. And wish them well.
- Before you go to the next exhibit, do your paperwork for this one.
  - **Judging Score Sheet:** For each of the 5 criteria (6 for a team exhibit) decide how well the student did and select the matching score; record the Total Points at the bottom. We won't let the student see the sheet or any of the judges' scores, so be honest, and don't worry about hurt feelings.
  - **Judge's Comments to Exhibitors**: The students and their adult sponsors appreciate comments that can help them improve their presentation and exhibit—and do better next year. Of course, the student will see your comments, these, so please make them kind and constructive.
  - **Disposition:** Keep both sheets until you return to the Judges' Room. Put your comment sheets in the marked box. Record your scores on the wall sheet, and put your score sheets in that marked box.
- Above all, remember your **goal**: to encourage the students. Therefore, watch what you say and how you act around them. **No matter how mature they may seem, they are still children, and full of insecurities!** As a general guide, *treat them as if they were your boss's child*. Back in the judging room, you can be brutally honest.; however, when you're out among the students, be kind.

## What are you Judging?

- The quality of the student's work, how well they understand their work, and how well they understand the field they've been working in. Only secondarily are you judging the physical display.
- A project which involves laboratory, field, or theoretical work, not just library research or gadgeteering.
- A middle school or high school student's work, and not that of a PhD candidate or a professional.
- This project at EISEF, as compared with other EISEF projects in the same category, and not with projects in other categories or at other fairs.

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## Judging criteria

### Creative Ability

- 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 the equipment?
- *Whose* creativity and originality? No science project is completely new and original: Even Isaac Newton said, "If I have seen further it is by standing on the shoulders of Giants." This means that you have to try to distinguish what the (middle school or high school) student created, versus the help they got from adults and research.
  - Did the student base the project mostly on a single outside source or suggestion? How much did they modify or extend it?
  - Did the student synthesize several sources or suggestions? What did they add to the synthesis?
  - A less sophisticated project that was the student's original idea is more creative than a polished project from a textbook or the internet.
- Collections aren't creative unless they support an investigation and help answer a question in an original way.
- Building something from a kit isn't creative unless the student used an unusual approach or changed the design significantly.
- How *valuable* is the student's result or finding? Is it just clever, or really (potentially) useful? A "Rube Goldberg" device may be ingenious, but if it is inefficient, unacceptable to a potential user, or unreliable, then it's not really a valuable creative contribution.
- Did the student research the project enough to be familiar with similar scientific projects or ideas?

### Scientific Method & Engineering Goals

#### Scientific Method

- Is the problem statement clear and unambiguous?
- Did the student limit the problem to something challenging that they could still handle?
  - Good scientists learn how to break a complex problem into segments which they can study.
  - Solving a simple problem does little to advance science.
  - Neither does working on a difficult problem without making progress.
- Did the student have a procedural plan to investigate the problem?
- Did they recognize the variables and define them?
- If controls were necessary, did the student recognize the need and use them correctly?
- Did the student collect enough data to support their conclusion?
- Does the student recognize the limitations of their data?
- Are the results reproducible? Will repeating the procedure give the same results?
- What's next? How would the student extend or expand their research?

#### Engineering Goals

- Does the project have a clear objective?
- If the project works, how will it benefit potential users?
- Is the solution:
  - workable?
  - acceptable to the potential user?
  - economically feasible?
- Can the solution be used as part of something else?
- Will the solution work with what's already in place? Or does it need new infrastructure? (Example: Cars weren't widespread and practical until we had gas stations, mechanics, and paved roads *everywhere*.)
- How does the solution improve on existing solutions?
- How did the student test the solution? Will it hold up in regular use? Will it tolerate abuse?
- Does the student recognize the ways the solution can fail?
- Can just anybody use the solution? Or only highly trained or experienced people?

# EISEF Judging Guide

## Skill

- Does the student have the skills required to do all the work necessary to obtain the data which support the project?
  - Laboratory skills?
  - Computation skills?
  - Observational skills?
  - Design skills?
- Where did the student work on the project? What type of help did they get from parents, teachers, scientists, or engineers? Did they get guidance or problem solving?
- Did some adult (like the Adult Sponsor) supervise the whole project? or did the student largely work on their own?
- Where did the student's equipment come from? Can they use the equipment unaided? Do they understand the proper use and purpose of their tools? Did they build or borrow the equipment?

## Documentation & Understanding

- Does the project carry out its purpose within the scope of the original aims?
- How completely did the project cover the stated problem?
- Are the student's conclusions based on the data they collected? Did they collect enough data to support the conclusions?
- Did the student keep notes, if appropriate? How complete are the notes?
- Did the student devote enough time to the project? Did they skip or overlook areas as time ran out?
- Does the student understand how the project ties in with related research?
- Does the student cite scientific literature or only popular literature (newspaper, *Reader's Digest*, etc.)?

## Presentation & Display

- How clearly does the student discuss the details of their project? Can they explain its purpose, procedure, and conclusions clearly and concisely? Watch out for memorized speeches with little understanding of the principles behind what they're saying.
- Does the student express the written material well? Does it seem like they wrote the written material, or an adult did?
- Do the student and the display present the main phases of the project in an orderly manner?
- How clearly does the student present the data and the results?
- How well does the project display explain itself?
- Does the student present the project in a forthright manner, without cute little tricks or gadgets?
- Did the student build the display mostly by themself, or did they receive excessive outside help?

## Teamwork (Team Exhibits Only)

- Was the work spread among the team members?
- Did each do part of the experiment and prepare part of the exhibit?
- On the other hand, can each team member discuss the whole project by themself?
- Do they present the exhibit as a team would? does one talk as the others point out the detail being described?
- If the exhibit has photos of the students at work, do they include all team members?

### Teamwork with a missing team member

EISEF allows a team project to exhibit if at most one member is missing—call her "Missy". You still have to figure out how well the team worked, from what "Remy" tells you. (If it's a 3-student project, then Remy and "Emile" both have to tell you what Missy did.) Suggestions:

- At the start, tell Remy to always describe Missy's contribution to each phase of the project.
- Does Remy say, "That was Missy's job; I don't know much about it"? or "Missy handled this. She explains it better than me, but here's what she did/learned"?
- Does it seem like Missy did a fair share of the project? all of the project? or none of it?
- If the exhibit has photos of the students at work, do they include both Missy and Remy, or just one of them?