

# Minnesota Academy of Science State Science and Engineering Fair Judges Guide

## **Welcome Minnesota Academy of Science State Fair Judges!!**

We thank you for so graciously donating your time and effort to encouraging the next generation of scientists! The Minnesota Academy of Science State Science & Engineering Fair Judging Committee has put together this short guide to orient you to the judging process. Although the information included in this guide is primarily intended for Grand Awards Judges, we hope that Special Awards Judges will find it useful as well. While this guide has been compiled by the Minnesota Academy of Science, we originally had relied on guidelines from Science Service (parent organization for ISEF) as well as the BASEF (Ontario, Canada) website.

The Judging Committee welcomes your feedback on this guide or any other comments or concerns you might have about the judging procedure – YOU, the judges, are an important piece of the State Science & Engineering fair!! Please let us know what we can do to make your experience the best it can be by contacting the Judging Chair at [judge@mnmas.org](mailto:judge@mnmas.org)



## Basic Information for Judges

### **Who can be a Project Judge?**

Any person who has a degree in a science, technology, engineering, or math (STEM) field, or years of experience in the field, is available on judging day, and enjoys encouraging smart, young students to pursue science! You do not need to have previous judging experience (we LOVE first-time judges!!)

Special Awards Judges are usually recruited directly by their organization (which is the organization sponsoring the special award). Each organization will have different qualifications that their Special Awards Judges need to satisfy. If you are interested in judging for your organization's Special Award, you should contact the person in charge of that award directly to see if you qualify!

**Grand Awards Judges are recruited by MAS and are seen by the students as the “main” judges of the fair. Because we have two different levels of students who compete (middle and high school students), we require different qualifications of judges at each level:**

To be a Grand Awards Judge for **high school** projects you must:

1. Have a Ph.D. in the category you are judging
- OR
2. Have a BS or BA or MS in the category you are judging and have at least 6 years industry/research experience in that category

To be a Grand Awards Judge for **middle school** projects you must:

1. Have a BS or BA in the category you are judging
- OR
2. Have a high school diploma and have at least 2 years industry/research experience in that category

If you have any questions on whether or not you qualify for a particular category, please feel free to contact the Judging Chair [judge@mnmas.org](mailto:judge@mnmas.org)

### **Grand Awards Judges vs. Special Awards Judges – I don't get it!!**

Grand Awards Judges are the “regular” judges – they will use the score sheets like the ones found in this guide and will be scheduled to interview students throughout the judging day. Grand Awards are presented to the top 30% of students participating and are determined by normalized Grand Awards Judges' scores and judge rankings from their conferences.

Special Awards Judges are either provided by the organization sponsoring the Special Award or, when the organization does not provide their own judges, recruited by MAS. These judges generally do NOT use the Scoring or Comment sheets that the Grand Awards Judges use, but instead choose the winning student(s) directly using organization-specified criteria for each award. Special Awards Judges do not

receive an interview schedule for talking with students; these judges interview their identified students in between scheduled Grand Awards Judge interviews.

**What should I wear?**

This is a “professional” event so dress accordingly! The students are often in business or business-casual wear and judges should dress similarly. Be sure to wear comfortable shoes!

**Will I get any training?**

Yes! Judge training for Grand Awards and ISEF judges is the morning of judging and begins after your registration.

**What if I get hungry?**

We’ll feed you! Enjoy a complimentary breakfast and lunch. Be sure to indicate on your registration if you have special meal requirements (vegetarian, vegan, Kosher, etc.)

**What have I gotten myself into?!**

An experience you’re going to LOVE! Not only can you have fun while helping others and encouraging today’s youth, but this is an excellent opportunity for networking, developing analytical, evaluation, & communication skills, and learning a LOT.



# Grand Awards Judging: Overview

**NOTE: If you are a Special Awards Judge, you can skip this section!!**

The vast majority of judges at the Minnesota Academy of Science State Science & Engineering Fair are Grand Awards judges. These are the judges who determine which projects win prizes in each category. The top 30% of participants will win a Grand Award Prize: Gold Grand (top 5%), Silver Grand (top 5-15%), or Bronze Grand (top 15-30%). Grand Awards are based on Grand Award Judges' conference decision.

## Overview

All Grand Awards judging is completed in a single day. The Event is divided into five main periods: (1) Judge check-in and training, (2) Pre-judging period (no students present), (3) Morning Grand Awards Judging Session (15-minute student interviews), (4) Afternoon Grand Awards Judging Session (15-minute student interviews) and (5) Call-Back session.

### **(1) Judge Check-In and Training**

Judges should report to the Judging Room (breakfast is available). Judges will sign in and be given their schedules for **both** morning and afternoon sessions. Judges will be randomly assigned to several projects within a given category. A short training session will be given and judges will be allowed into the Exhibit area (with no students present) to prejudge their morning and afternoon projects.

### **(2) Pre-Judging Period**

Pre-judging allows all judges an opportunity to briefly review the overall scope of their assigned projects. It is crucial that judges spend some time looking at data notebooks and SRC paperwork to ensure that the project was completed by the student. This is also a useful time for formulating questions for the student interview. **Please note: there is only ONE pre-judging period – you should look at your morning AND afternoon projects during this time.**

### **(3) Morning Judging Session**

Each judge will be scheduled to conduct several 15-minute interviews. Judges should manage their time carefully; a warning buzzer will sound at 13 minutes and an announcement will be made at the end of each interview period. During this time, the Special Awards judges may also be on the floor and may listen in on your interviews, but Grand Awards Judges have priority. Judges should give a rough score to each project at the end of the interview, but this should not be done at the student's project.

A Judges lunch is provided. This will be the judge's first chance to conference with other judges on the team about the outstanding projects they have seen and share with other judges on their team. This would also be a great time to start writing comments for the projects you have judged in the morning session.

### **(4) Afternoon Judging Session**

Each Grand Awards judge will be scheduled to conduct several 15-minute interviews.

### **(5) Call-Backs/ Conferencing**

A 30-minute session will have judges conferencing with the other judges in their category. Students will be available in the exhibit hall for additional interviews to assist judging teams in making final decisions and resolving ties. Team Captains will report projects to the judges' coordinator as soon as possible.

Scoring by Grand Awards Judges is inherently subjective (judges may be impartial scientists, but they're still HUMAN!), so ***in an attempt to emulate the judging found at the INTEL ISEF we will be using conference judging in which judges are encouraged to discuss projects with their colleagues, especially those in their judging team.***



# Special Awards Judging: Overview

**NOTE: If you are a Grand Awards Judge, you can skip this section!!**

Organizations that provide special awards for the Minnesota Academy of Science State Science & Engineering Fair usually also provide their own Special Awards Judges to judge the projects. Each Special Award has specific criteria that determine which projects are eligible to compete for and receive the award.

## Overview

All special award judging is completed in one day. This day is divided into three main periods: (1) Judge check-in and training (2) Pre-judging period, and (3) Morning and Afternoon Special Awards Judging Sessions, please note there is an overlapping time when all students will be at their projects. Special Awards Judges may turn in their decisions on winners as soon as they have made their selections.

### **(1) Judge Check-In and Training**

Judges should report to the judging room. Judges will check-in and a short training session will be given.

### **(2) Pre-Judging Period**

Pre-judging allows all judges an opportunity to briefly review the overall scope of their assigned projects as well as spend more time looking at data notebooks and paperwork. This is also a useful time for developing questions for the student interview. Please note: there is only ONE pre-judging period which is in the morning.

### **(3) Special Awards Judging Session**

Special Awards Judging takes place in the morning and afternoon. However, during that time, the Grand Awards Judges will have scheduled interviews with students and have priority. During these times, Special Awards Judges can listen in on interviews and talk to students when they are not being interviewed by a Grand Awards Judge, but should not be involved in the interview. At Noon, Grand Awards judges will leave the Exhibit Hall and the Special Awards Judges will have unopposed judging time with all the morning students until lunch. At this time the other half of the students will enter to stand by their projects and the Special Awards Judges can judge those new projects unopposed, until the Grand Awards Judges enter again.

**GRAND AWARDS JUDGES HAVE PRIORITY WHEN THEY ARE INTERVIEWING THEIR SCHEDULED PROJECT. SPECIAL AWARDS JUDGES MAY OBSERVE THE INTERVIEW BUT SHOULD NOT BE AN ACTIVE PARTICIPANT.**

**\*\* Special Awards Judges have priority ONLY during unopposed judging periods.** During other times, Special Awards Judges may listen to (but not participate in) Grand Awards Judges interviews and interview students ONLY when no Grand Awards Judge is judging that student.

# Judges Tips

1. **Provide a good experience for the students** This is more than a competition; it's an educational and motivational experience for the students. The high point of the fair experience for most students is being interviewed by judges!! You are an evaluator, a counselor, a motivator, and a role model with three main ways to communicate with the students:

Behavior: Be genuine and let the students show their stuff -- don't be the judge whose behavior or comment turns a student off science forever!

Interview: Put the student at ease – sit down, encourage conversation...smile! Ask students about their project, show you are interested, and let the student teach you something.

Feedback: The only written feedback the students will get from you are the comments you write on the comment sheet – please write as many comments as you have time for, especially if a student scored particularly high or low in one or more categories. **Please make certain you are writing specific comments.** General comments “this was good” do not help the student. Specify what was good, what did you like, and specifically what should they do if anything, for improvement?

2. **Choose the Best, Encourage the Rest!** Examine the quality of the student's work and how well they understand the project & area of study in each category listed on the scoring sheets. Focus on awarding points for things done; not penalizing the student for NOT doing something. *How do you choose the best?* Here are some key items that experienced judges and mentors often see in an “outstanding” project:

- *Evidence of substantial background research*
- *Clear hypothesis*
- *Good use of graphs and tables to present their data*
- *Repeated experiments (done more than once or twice)*
- *Statistical analysis*
- *Student understanding of sources of error*

3. **Be consistent with your scoring** Every judge scores a little (or a lot!) differently; each judge must judge their OWN projects consistently – don't worry about matching another judge's score! Be sure to go back through your scores after judging all the projects in one session and make sure that your final scores correspond with the order in which you would rank your projects. Revision of scores is expected (and encouraged!) if it leads to more consistent evaluation of several projects.

# Judges Tips: Sample Questions

## **To Judge Creative Ability:**

- Why is this project important to you?
- Where did you get the idea for your project?
- What did you enjoy most about your project?
- Of what value is your project to society?
- What problems arose during your investigation?
- How did you overcome them?
- Do your results indicate further study is needed?

## **To Judge Scientific Thought or Engineering Goals:**

- What is the purpose/objective of your study?
- What are some previous studies?
- What are possible sources of error?
- What is/are your controls?
- Why did you do the statistical analysis you did?
- What does it mean?

## **To Judge Thoroughness:**

- How many times did you repeat your tests?
- On what did you base your conclusions?
- Are there any other approaches you might have taken to your research?
- How much time did your study take?

## **To Judge Skill:**

- What instruments did you use for your measurements?
- Who helped with your project?
- Do you think you could continue this project on your own?
- What would you do differently?

# Judging Tips: Mentored Projects

This wonderful event calls together middle and high school students from around the state of Minnesota – all of whom have already “won” at one of nine Regional Science Fairs. You can expect to see a WIDE variation in the quality of projects you will judge – one student may be reporting the effect of Coke on green bean sprouting times (again!) whereas another may have had a mentorship at the Mayo Clinic and is presenting data on melanoma cure rates using the newest anti-cancer drug.

How can projects this distinct be judged against each other --won't the mentored project always win, hands down? And what about that really cool-looking display that comes with its own lighting system -- doesn't that automatically get them a better score? I mean...WOW!!

Okay...now that we've gotten the “WOW” factor out of the way, let's look at the SCIENCE...that's what we're here for! The fact is that students across the state (country, world) have vastly different access to resources, period. But bad science on a beautiful, impressive board is still bad science...and using the latest cancer drug on patients, while fascinating, possibly was not done by the student alone and most certainly was not an original idea the student came up with.

Whether you're a Grand Awards or Special Awards Judge, the Judging Score Sheets can be a huge help in these instances to help you distance yourself from the emotional impact (the “Wow” factor) that these projects might have and focus on the science. From the Score Sheet you can readily appreciate that the type of display (other than how it communicates the science) figures only minimally into the project score, whether the display is huge and glitzy or small and duct-taped together. To help you prepare in advance, sample Grand Awards Judging score sheets are provided in the back of this judging guide – feel free to use these to plan your judging strategies!

Mentored projects are a bit more complicated. It's up to you, as a judge, to determine how much of this project is the student's work and how much is the mentor's...and to generate a score based on the student's portion.

**To help you determine this, each student who performed their research at a research institution will have a form (Form 1C – see attached) displayed at their project, filled out by their mentor, detailing the student's contribution to the project!** This, plus talking to the student and using your Score Sheet as a guide, will help keep the playing field level, yet allow those students who really excel at science to succeed!!

**THANK YOU** once again for volunteering to judge – there would be NO Minnesota Academy of Science State Science & Engineering Fair for the students without all of you!

As always, the Judging Chair, Planning Committee and Lise Weegman, director of the MN State Science & Engineering fair welcome your feedback on this guide or any other questions, comments or concerns you might have about judging –

Please let us know what we can do to make your experience the best it can be!! Contact us at: [judge@mnmas.org](mailto:judge@mnmas.org)

## Regulated Research Institutional/Industrial Setting Form (1C)

This form must be completed by the scientist supervising the student research conducted in a regulated research institution (e.g., universities, medical centers, NIH, etc.) or industrial setting.

This form **MUST** be displayed with your project.

Student's Name \_\_\_\_\_

Title of Project \_\_\_\_\_

**To be completed by the Scientist (NOT the Student or Adult Sponsor) after experimentation:**

The student conducted research at my institution: (check one)

- a)  only to use the equipment      b)  to perform experiment(s)

**If b, the following questions must be answered.**

1) How did the student get the idea for her/his project?

(e.g. Was the project assigned, picked from a list, an original student idea, etc.)

2) Were you made aware of the ISEF rules before experimentation?       Yes       No

3) Did the student work on the project as a part of a research group?       Yes       No

If yes, how large was the group and what kind of research group was it (students, group of adult researchers, etc.)

4) What specific procedures did the student actually perform and how independently did the student work?

Please list and describe. (Do not list procedures student only observed.)

## Form 1C for Mentored Projects

Forms from: <http://www.societyforscience.org/isef/index.asp>

# JUDGES' SCORING SHEET FOR PROJECT PRESENTATIONS

## MINNESOTA ACADEMY OF SCIENCE- STATE FAIR - GRAND AWARDS JUDGE'S SCORING WORKSHEET

Time Period \_\_\_\_\_ Project # \_\_\_\_\_ Student's Name \_\_\_\_\_

Grand Awards judging is conducted using a 100-point scale with points assigned to creative ability, scientific thought or engineering goals (II a and b, respectively), thoroughness, skill, and clarity. Team projects have a slightly different balance of points that includes points for teamwork. Following is a set of criteria that can assist you in interviewing the student and aid in your evaluation of their projects.

| Guidelines   | Notes | Points Available             | Points Awarded |
|--|-------|------------------------------|----------------|
| I. Creative Ability <ul style="list-style-type: none"> <li>• in question</li> <li>• investigation</li> <li>• data</li> <li>• approach</li> </ul>                                 |       | Individual - 30<br>Team - 25 |                |
| II a. Scientific Thought<br>(if an engineering project, see II b) <ul style="list-style-type: none"> <li>• design</li> <li>• variables/controls</li> <li>• conclusion</li> </ul> |       | Individual - 30<br>Team - 25 |                |
| II b. Engineering Goals <ul style="list-style-type: none"> <li>• Workable/ economical</li> <li>• Potential use</li> </ul>  |       |                              |                |
| III. Thoroughness <ul style="list-style-type: none"> <li>• coverage</li> <li>• replication?</li> <li>• awareness of area</li> <li>• completeness of notes</li> </ul>             |       | Individual - 15<br>Team - 12 |                |
| IV. Skill <ul style="list-style-type: none"> <li>• possesses necessary skill</li> <li>• help provided?</li> </ul>  |       | Individual - 15<br>Team - 12 |                |
| V. Clarity <ul style="list-style-type: none"> <li>• in discussion</li> <li>• written work</li> <li>• display</li> </ul>  |       | Individual - 15<br>Team - 12 |                |
| VI. Teamwork (for Team Projects Only) <ul style="list-style-type: none"> <li>• contribution of team members</li> <li>• coordinated efforts</li> </ul>                            |       | Team only - 16               |                |
| TOTAL  |       |                              |                |

*"Award the best., Encourage the rest"*

PLEASE KEEP THIS SHEET WITH YOU UNTIL THE JUDGING PROCESS HAS BEEN COMPLETED!  
RETURN IT, ALONG WITH ALL REMAINING PAPERWORK, TO YOUR CATEGORY LEADER.

Judges Name \_\_\_\_\_ Category \_\_\_\_\_ Team \_\_\_\_\_