

COORSTeK

2021 JUDGE GUIDE

DENVER
METRO
REGIONAL
SCIENCE AND
ENGINEERING
FAIR 

COORSTeK DENVER METRO
REGIONAL SCIENCE AND
ENGINEERING FAIR

FEBRUARY 15-22, 2021

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<https://clas.ucdenver.edu/denversciencefair/>

WELCOME

...to the CoorsTek Denver Metro Regional Science and Engineering Fair!

On behalf of the entire DMRSEF team, **THANK YOU** for volunteering your time, enthusiasm and expertise to support and encourage our students on their STEM journey! This regional fair is open to students in grades 6-12 from public, private, parochial, charter and home schools in 7 metro Denver counties (Adams, Arapahoe, Broomfield, Clear Creek, Denver, Douglas, Jefferson, and Summit counties). The primary purpose of the regional fair is to recognize student achievement and to qualify students to go to the state level fair. We want our best projects to be competitive at the state level, so we strictly follow the ISEF (International Science & Engineering Fair) rules for pre-college science research. **Please remember every student here is interested in science and has tried their best.** Whether their project is outstanding or not, their effort deserves attention at the fair. All projects should receive equal time at this level of competition. Students will be at many different skill levels, from first time participants to returning state participants, so there will be a large range of project quality. This is completely normal for this age group especially in the Junior Division.

Do not expect professional-level posters. Please be respectful of their time and encourage their learning.

FAIR TIMELINE

Monday, February 15th - Virtual fair opens! Judges may begin reviewing projects.

Saturday, February 20th- Category Judging (student interviews) 9 a.m. - 4:30 p.m.

Call for Senior Judges & Welcome	8:50 a.m.
Senior Judging for all categories	9:00 a.m. – 12:00 p.m.
Senior judging team meetings	12:00 p.m. -12:30 p.m.
Call for Junior Judges & Welcome:	12:30 p.m.
Junior judging for all categories	12:40 p.m. -3:00 p.m.
Junior judging team meetings	3:00 p.m. - 3:30 p.m.
Senior team captains and BIF team	3:30 p.m. – 4:00 p.m.
Junior team captains and BIF team	4:00 p.m. - 4:30 p.m.

Sunday, February 21st - Special Awards and Best in Fair Judging 9 a.m. - 2:00 p.m.

Monday, February 22nd - Awards Ceremony 6:00 – 7:00 p.m.

JUDGING LOGISTICS

Prior to the week of fair, judges are required to submit a volunteer waiver, which can be found [HERE](#). If you have not yet completed this waiver, please email your completed waiver to: Denversciencefair@ucdenver.edu

Thank you for registering in zFairs! Moving forward, we will be using Symposium, an online platform for hosting events and showcasing projects.

This link will be live on February 15th:
<https://symposium.foragerone.com/2021-dmrsef/>



PROJECT REVIEWS

MONDAY, FEBRUARY 15TH - FRIDAY, FEBRUARY 19TH:

Projects will be displayed in our virtual showcase at:
<https://symposium.foragerone.com/2021-dmrsef/>.

During this week, judges are expected to review each of their assigned projects. Each student is required to upload a poster presentation (up to 12 page pdf) and a short (maximum 3 minute) introductory video. You can [view the student project requirements here](#) on the [Students tab of our website](#).

Please carefully review all materials, as well as any supplemental materials, that were uploaded for your assigned projects. It is also helpful to prepare interview questions for your assigned projects during this time, as the time spent with each student is limited. We also recommend viewing the other projects in your assigned category, so you are familiar with the range of project quality.

You will receive your project assignments the week prior to February 15th. Please keep your judging assignments confidential.

Best-in-fair judges should also use this week to review projects and be familiar with the possible candidates, prior to meeting with Category Captains on Saturday.

STUDENT INTERVIEWS

SATURDAY, FEBRUARY 20TH

Student interviews with judging teams will take place between **9:00 a.m. and 12:00 p.m. for Senior Division (Grades 9-12) projects. Junior Division interviews will take place between 12:40 p.m. and 3:00 p.m.** This year, you will be interviewing students as a judging team. There will be 2-3 judges on each team and you will be assigned to a Division and a Category. For larger categories, we will have multiple judging teams. Most teams will judge between 3-6 projects. While you are interviewing as a team, each judge will submit a completed judging rubric for each student project they are assigned.

We will conduct the interviews over Zoom. We will send you a Zoom link for the judging interviews no later than February 15th. Judges for the Senior Division will call in no later than 8:50 a.m. Junior Division judges will call in no later than 12:30 p.m. When you arrive in the Zoom call, you will enter the main room, where DMRSEF staff will greet you and give a brief reminder of the format for the day. Then you will be sent to Zoom breakout rooms with your judge teammates. You will have approximately 10 minutes with your team, prior to your first student interview. In between the 15 minute student interviews, you will have a 5 minute break to chat with your teammates, grab some water, etc.

Each student interview will last for 15 minutes. When students enter your breakout room, briefly introduce yourselves. Additionally, students have been instructed to introduce themselves and their project briefly (1 minute or less) when they enter the Zoom breakout room with the judging team. Following the introductions, ask the student questions to clarify aspects of the project, determine how the student got the idea for the investigation, and measure the level of understanding of both the project and its underlying science. Given the short time span of this interview, and that multiple judges are interviewing together, please ensure that your questions are detailed and specific and will provide insight to you and the other judges about the quality and merit of the project.



STUDENT INTERVIEWS CONTINUED

You are using the student interviews to help formally evaluate your assigned projects but also to provide these students with the opportunity to share their science with professionals. This is the high point of the fair for the students! Treat this interaction like a job interview, remembering to be professional, refrain from asking questions about race, ethnicity, religion, or personal topics, and avoid being overly familiar with students. If at any point during the student interviews you have questions or need advice/support from DMRSEF staff, please use the “Help” feature in the Zoom breakout room and a DMRSEF staff member will come join your room. You may also call or text the Judge Coordinator, Samantha Sands, at 248-760-6077 for support.

At the end of the scheduled interviews (no later than 12:00 p.m. for Senior Division judges and 3:00 p.m. for Junior Division judges), teams will meet (in their Zoom breakout rooms) to discuss projects and decide on awards. This year, each judge will be submitting electronically completed rubrics (more details later in this document). The team captain will lead the team meeting, moderate the discussion, ensure that each judge has submitted a rubric for each student they interviewed, and submit award decisions to the judging coordinator. Category judges are dismissed for the day once the team meeting is over and all rubrics are submitted.



CATEGORY CAPTAINS AND BEST-IN-FAIR TEAM

Saturday afternoon, Category Captains will meet with the Best-in-Fair team to make recommendations for the top projects at the fair. Senior Division Category Captains will meet with the BIF team from 3:30-4:00 p.m. and Junior Division Category Captains will meet with the BIF team from 4:00-4:30 p.m. During this meeting, each captain will give a brief overview of the top project(s) in their category and if they feel it is a high-quality project, recommend the project for a BIF candidate. It is important to note that some categories may be stronger than others and we do not expect that the winner of each category is a contender for a best-in-fair award. However, a project must win in its category to be considered for BIF. In rare cases, first and second place projects from one category may be considered for BIF, but the 1st place project would need to place in BIF in order for the 2nd place project to place. At the conclusion of the Captains and BIF team meetings, the BIF team will have a shortlist of projects to consider for BIF. That list will be shared with the DMRSEF staff, who will schedule interviews with those students and the BIF team for Sunday, February 21st. DMRSEF staff will email BIF student contenders, as well as the BIF judging team, by 8 p.m. on Saturday evening to notify the students and judging teams of the assigned interview times for Sunday.

Additionally, this year we are requesting the Category Captains assist us in announcing the winners for their category. We will be posting videos on Monday, February 22nd to announce the winner of each category, before the live virtual awards ceremony on Monday night at 6p.m. Prior to the fair, we will send additional instructions to Category Captains about these announcement videos.



STUDENT INTERVIEWS: BEST-IN-FAIR AND SPECIAL AWARDS

SUNDAY, FEBRUARY 21ST

Best-in-Fair: Projects that are in consideration for Best-in-Fair will have interviews between 9 a.m. and 2 p.m. on Sunday. These interviews will be 15 minutes and will be scheduled by DMRSEF staff. The BIF team will interview each student in consideration for BIF in both the Junior and Senior Division. After completing the interviews, the BIF team will meet to discuss the projects and select the top 3 Junior and top 3 Senior Division projects. Interviews will use Zoom and a Zoom link will be sent to the judging team Saturday night along with the interview times. We will use breakout rooms, the same as our Saturday judging process.

Special Awards: Special Awards have the option to interview students on Sunday between 9 a.m. and 2 p.m. Special Awards judges will notify staff of the students they would like to interview and these interviews will be scheduled by DMRSEF staff.

AWARDS CEREMONY

MONDAY, FEBRUARY 22ND

If you are available, please consider joining us for our live-streamed award ceremony on Monday evening at 6 p.m. We will be announcing the Best-in-Fair winners, as well as special awards.

AWARDS

DMRSEF enters the top 10% of our middle school winners in the Broadcom MASTERS competition for middle school students. 300 MASTERS are identified from nationwide entrants and then 30 finalists are selected to attend the final competition. Our Best in Fair high school winners receive monetary awards and trips to the Regeneron International Science and Engineering Fair (ISEF) to compete with students from around the world. Our best in fair and category winners at the middle and high school levels receive monetary awards and are eligible to compete at the Colorado State Science and Engineering Fair (CSEF). Top winners at the state fair will also be nominated for Broadcom MASTERS and the Regeneron ISEF. Numerous special awards of certificates, money, or prizes are given by associations, schools, and other community groups to DMRSEF students. Please let the fair coordinators know if you, your employer, or an organization you are a member of would like to sponsor a special award.

EVALUATION GUIDELINES

The guidelines used to evaluate students at the DMRSEF, included below, comply with International and State-level standards and are meant to set students up for success as they move on to higher levels of competition. Please review these before the fair so you are familiar with our assessment criteria and scoring.

Students may have worked on a research project for more than one year. However, for the purpose of judging, **ONLY** evaluate research conducted within the current year. Compare projects only with those competing at this Fair and not with projects in other competitions or scholastic events. Try to determine how much guidance was provided to the student in the design and implementation of his or her research. Please do not share your opinion with the student about their performance in relation to the other students. Do offer praise!

Please be discreet when discussing winners or making critical comments. Results are confidential until the awards ceremony. Judges represent professional authority to the students and should use an encouraging tone when asking questions or offering suggestions. Judges should not criticize, treat lightly, or display boredom toward projects they consider unimportant. Consistency and respect are key to positive judge-student interactions.

If you think that a project has violated Science Fair rules or other regulations (local, state, or federal), do not bring up the matter with the student(s). Please discuss the matter with the Science Fair Director or Judging Coordinator. All projects are screened by a Scientific Review Committee so you should assume that projects comply with all relevant rules and regulations. Any allegations of rules violations should not be part of the judging process and should not be discussed when deciding awards.

This year, you will be using an online form to submit your scores. We will send you a link to the judging forms prior to the start of the fair on February 15th. We have included a sample of the evaluation form in this document. You may print copies of this form and take notes during the week, while you review projects, and during the student interviews. However, all final forms must be submitted online. We appreciate your taking the time to write comments for every project you judge. Comments for improvement will be important for students moving on to the state competition or returning to our fair next year.

EVALUATION GUIDELINES CONTINUED

We have also included details about the criteria you will use to evaluate students' projects. These criteria are based on the criteria used to judge the International Science & Engineering Fair.

Each criteria will be evaluated on a 10 point scale, with 1 being the lowest and 10 being the highest.

Point Scale:

- 1-4 Developing
- 5-6 Average
- 7-8 Good
- 9-10 Exemplary

A few things to keep in mind when judging projects:

- If the project was done at a research or industrial facility, the judge should determine the degree of independence of the finalist in conducting the project.
- If the project was completed at home or in a school laboratory, the judge should determine if the finalist received any mentoring or professional guidance.
- Please note that both team and individual projects are judged together, and projects should be judged only on the basis of their quality. However, all team members should demonstrate significant contributions to and an understanding of the project.



EVALUATION CRITERIA

RESEARCH QUESTION

- Question/problem is clearly stated
- Question was sufficiently limited to allow a solution to be found
- Question is testable using the scientific research process
- Originality in questions asked
- Research addresses a meaningful problem

DESIGN & METHODOLOGY

- A procedural plan was in place for obtaining a solution/answer
- Project demonstrates a well-designed plan and method of data collection
- Variables were clearly recognized and defined
- If controls were necessary, the student(s) recognized their need correctly utilized them
- Student(s) had the required laboratory, computation, observational and design skills to obtain supporting data
- The purpose was carried out to completion within the scope of the original intent

EXECUTION

- There was adequate data to support the conclusions
- There was adequate assistance from parents, teachers, scientists, etc.
- The time spent on the project was appropriate
- Project contains sufficient data collected to provide evidence to support interpretation.
- Student(s) made recommendations for further research

CREATIVITY

- The project shows creative ability and originality in the questions asked, the approach to solving the problem, the analysis of data, or the interpretation of that data
- The student's(/s') findings helps to answer their question in an original way
- The student's(/s') findings promote an efficient and reliable method for solving a problem

POSTER/SLIDES

- Student(s) demonstrated an understanding of the project which is reflected in their written materials
- Important phases of the project are presented in a logical and orderly manner
- Data is clearly and correctly presented
- Results and conclusions are clearly presented
- Poster possesses clarity of graphics, legends and supporting documentation

INTRODUCTORY VIDEO

- Video is clear and audible
- Student(s) demonstrated preparation and thoughtfulness in content of video
- Student(s) clearly introduced themselves and their project
- Student(s) provided a well-rounded overview of their purpose, procedures, and conclusions

INTERVIEW

- Student(s) exhibited clear, concise, thoughtful responses to questions
- Student(s) demonstrated an understanding of the interpretation and limitations of results and conclusions

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NAME(S)

PROJECT #

PLEASE EVALUATE THE PROJECT ON THE FOLLOWING ELEMENTS:

Criteria:	Score:	Notes:
Research Question	/10	
Design & Methodology	/10	
Execution	/10	
Creativity	/10	
Poster (slides)	/10	
Introductory Video	/10	
Interview	/10	

ANY CONSTRUCTIVE COMMENTS FOR THE STUDENT(S):

ADDITIONAL COMMENTS FOR DMRSEF TEAM:

HOW TO BE A GOOD SCIENCE FAIR JUDGE

ADAPTED FROM: [HTTP://CSEF.USC.EDU/JUDGES/GOODJUDGE.HTML](http://csef.usc.edu/judges/goodjudge.html)

INTERVIEWING 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 this type of high-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

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 them the answers. If you really feel compelled to make explanations, please share these comments with the students on your judging forms.

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

1. 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
2. The student should be doing most of the talking
3. Encourage the student to conduct more experimentation in order to verify the new conclusions

GUIDING THE DISCUSSION

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:

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- A black and white photograph of a student with dark hair, seen from the side, sitting at a desk and writing in a notebook with a pen. In the background, another student is visible, and there are some white structures, possibly part of a science experiment setup. A book or brochure is partially visible on the desk in the foreground.
- *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.***

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.

