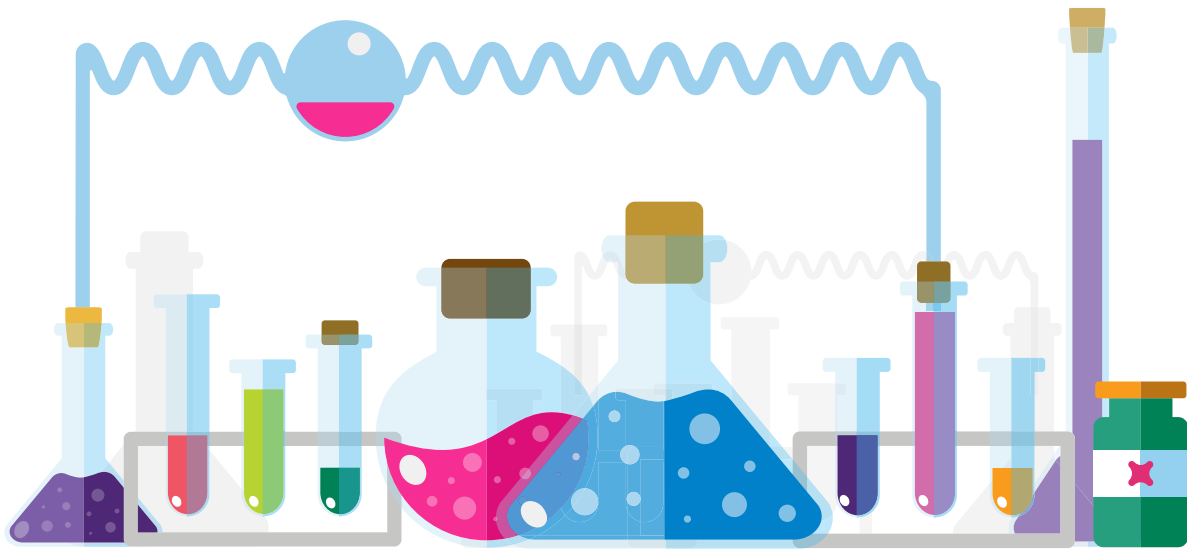


CALLING ALL BRAINIACS



69TH ANNUAL HIGH PLAINS REGIONAL SCIENCE & ENGINEERING FAIR

Fair Date: March 26, 2024
Registration Deadline: March 8, 2024

m SOUTH DAKOTA MINES[®]

Participant's Guide



TABLE OF CONTENTS

Summary.....	1
Fair Director	1
Fair Schedule	2
Parking	3
Helping Students Choose an Original Topic.....	4
Scientific Experiment vs. Designing Equipment.....	4
Importance of Log Books.....	5
Display Size and Set Up.....	6
Judging Criteria and Feedback	7
Special Awards	8
ISEF Quailifier	8
Judging Sheet.....	9

SUMMARY

This participant's guide has been created to help teachers prepare their students for the High Plains Regional Science & Engineering Fair (HPRSEF) hosted by South Dakota Mines. Middle and high school students in western South Dakota and eastern Wyoming are invited to compete in the fair.

Each student can enter only one project. A team of no more than three students may also submit a group project. Projects are separated into the following categories: biological sciences, engineering, physical sciences, and social sciences. The top five students in each category in each middle school grade and the top three projects in each category in the high school division will win category awards. There are also additional special awards listed later in the guide.

We realize that some middle and high schools hold their own science fairs that may create conflicts in meeting our registration deadline. If this problem arises for your school, please reach out to the fair director listed below and reasonable accommodations can be made. Photo release forms signed by a parent or guardian are also mandatory for every participant and can be found on the registration website.

The registration website can be found here:
www.online-registration-system.com/sd/hprsef/

HPRSEF adopts all rules enforced by the International Science & Engineering Fair (ISEF). While some of the most common rules will be summarized in this guide, please refer to their International Rules and Guidelines book to find a more comprehensive list. The full ISEF International Rules and Guidelines book can be found here:
sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2022/Rules/Book.pdf

The formal check-in process the day of the fair was eliminated. In lieu of stopping at a check-in table upon arrival just to find out where the student projects are located, the fair director will send each teacher a packet of name tags for all their students which will list where their project booth is located. This process seemed to work smoothly last year, so we will continue with this method going forward.

This guide should provide answers to most of your questions, but please feel free to contact the fair director at the information below if you need further information.

FAIR DIRECTOR

Jade Herman
South Dakota Mines, Office of the President
501 E. St. Joseph Street, Rapid City, SD 57701

Jade.Herman@sdsmt.edu

Office: 605.394.1718

FAIR SCHEDULE

The day of the fair is very hectic, so please familiarize yourself and your students with the fair schedule. We don't want students to miss their judges. This is especially important for the high school students—our special awards judges determine who will qualify for ISEF, and if the students aren't at their booths during the special awards judging time, they can't be considered. All events are held in the King Center.

7:00 am to 8:30 am	Project set-up open, Fraser & Goodell Gyms
7:00 am to 8:00 am	Judges check-in and breakfast, Music Center
8:00 am to 8:30 am	Judges briefing, Music Center
8:30 am to 10:00 am	Closed judging, Fraser & Goodell Gyms
8:45 am to 9:45 am	Entertainment Session, Goodell Gym (Students should sit on wood bleachers)
10:00 am to 12:00 pm	Student interviews/open judging, Fraser & Goodell Gyms Teachers' Lounge, Group Workout Room (2nd Floor of King Center)
12:00 pm to 1:00 pm	Lunch and deadline to turn in scores, lunch provided for judges only in Group Workout Room (2nd Floor of King Center) (Students and teachers are on their own)
1:00 pm to 1:30 pm	Special awards judging for high school students only
1:30 pm to 2:30 pm	Projects open to the public, Fraser & Goodell Gyms
2:30 pm to 3:00 pm	Project tear-down, Fraser Gym
3:00 pm to 4:00 pm	Awards presentation, Goodell Gym
4:00 pm to 4:30 pm	Project tear-down, Goodell Gym

Please note that we **do not** provide lunch for teachers and students. However, if you wish to make arrangements to eat in our cafeteria or have our catering staff deliver sack lunches to the King Center, please contact the Sodexo Campus General Manager at 605.415.8837 at least **two weeks in advance**.

There may be some downtime in the afternoon while the projects are open to the public, so feel free to have your students do homework at their booths during this time. Also, please note that any projects left after tear-down will be discarded.

An entertainment session will be held during the time when students must leave their projects during closed judging. It is not mandatory for everyone to attend, but it is a very fun presentation that students will enjoy. You could also visit other areas on campus, such as the Museum of Geology, during the same time frame if you wish.

PARKING

The map below indicates the parking lot that should be used for regular vehicles.

If students are arriving via bus or large capacity vans, your drivers should plan to have your students dropped off at the south entrance to the King Center and then park the bus/van in the O'Harra Stadium parking lot.

We have over 100 judges who volunteer for the fair and many of them come from off-campus. Parking is limited, so we try not to take up too many spaces with busses/vans.

Also, the parking lots will have signs that say permits are required, but they are not enforced during the fair.



HELPING STUDENTS CHOOSE AN ORIGINAL TOPIC

Anybody who has been to more than one science fair knows there are projects that are completed every year (i.e. volcanoes, how far do different types of balls bounce, how does some type of physical activity affect heart rate, etc.). Encourage your students to come up with original ideas by presenting some of the sample topics:

Personal interests: hobbies, sports, social interactions, animals

Personal experiences: travel, chores, health/nutrition, agriculture

Advertisements: testing product claims or new products, transportation

Journals/Textbooks/Periodicals: future technology, medicine, consumer products

Family: genetic traits, hereditary diseases, parent/relative professions

Current events: social issues, natural disasters, conservation

This is just a very general list of topics to help your students begin to think a little outside of the box. Encourage them to use their imaginations and they will have no problem coming up with an original idea.



SCIENTIFIC EXPERIMENT VS. DESIGNING EQUIPMENT

Most students will develop a project that requires experiments or designing a new piece of equipment. One thing to note is our judges typically look to make sure some type of experimental research or innovative design process is involved with every project. We encourage students to focus on these types of projects rather than simply reviewing existing literature without some sort of test or experiment.

Here are some basic steps for each type of project:

Scientific Experiment

1. State a testable question
2. Perform background research
3. Formulate hypothesis and identify variables
4. Design a procedure
5. Conduct the experiment
6. Analyze results and draw conclusion

Designing Equipment

1. Define a need
2. Perform background research
3. Establish design plan
4. Build and test prototype
5. Repeat building/testing as necessary
6. Summarize performance results



I IMPORTANCE OF LOG BOOKS

As your students are conducting their experiments or designing prototypes, be sure they keep a log of their data, any problems they encounter and how they were addressed, notes on how problems and variables affected their data, changes to their design plans, and even notes summarizing information they used from their background research that helped them develop their experiment or design. They should be making notes after each of their experiment trials or design tests along with any changes in variables or design plans.

Judges often look through their log books during the closed judging period to develop questions for the students during open judging. The log books should be detailed enough to provide the judges with a good idea of the students' trials, but not so detailed that they must spend more than 10 minutes reading them. They should also be organized, so they're easy to read—this might involve the students transferring their data into a second log book after they completed their experiments and tests, so they can organize it as necessary.

DISPLAY SIZE AND SET UP

In accordance with ISEF rules, the maximum size of a project display is as follows:

Height: 108 inches Width: 48 inches Depth: 30 inches

All project spaces at HPRSEF will have a taped-off portion of a standard folding table to utilize for the display board. All project materials must fit on the table in the taped-off section. It is suggested that students have 3-5 copies of their abstracts at their booth to give to judges for review. Any photos that are used on the display board should have a credit line below that indicates where the photo was copied from or who took it. Also, if electrical power is necessary for your student's project display, or if your students need seating due to an injury or ADA requirements, please notify the fair director at least two weeks prior to the fair.

ISEF also prohibits the use of the following items at a project display:

- Living organisms, including plants
- Glass objects
- Soil, sand, rock, cement and/or waste samples, even if permanently encased in a slab of acrylic
- Taxidermy specimens or parts
- Preserved vertebrate or invertebrate animals
- Human or animal food as part of the project
- Human or animal body parts or fluid
- Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non-manufactured state
- All chemicals including water as part of the project
- Hazardous substances or devices
- Items that may have been in contact with hazardous chemicals
- Dry ice or other sublimating solids
- Sharp items
- Flames or flammable materials
- Batteries with open-top cells or wet cells
- Drones or any flight-capable apparatus
- 3D Printers unless power source removed
- Inadequately insulated apparatus capable of producing dangerous temperatures
- Any apparatus with belts, pulleys, chains, or moving parts with tension or pinch points that are not appropriately shielded
- Any display items that are deemed distracting
- Personal items or packing materials stored underneath the table or in the booth overnight
- Any other apparatus deemed unsafe by the fair committee

Please refer to the ISEF Rules and Guidelines book for a more detailed listing of items allowed/not allowed at project booths. It is better to ask the fair director ahead of time if any part of your students' projects seem questionable rather than the student being disqualified during the fair.

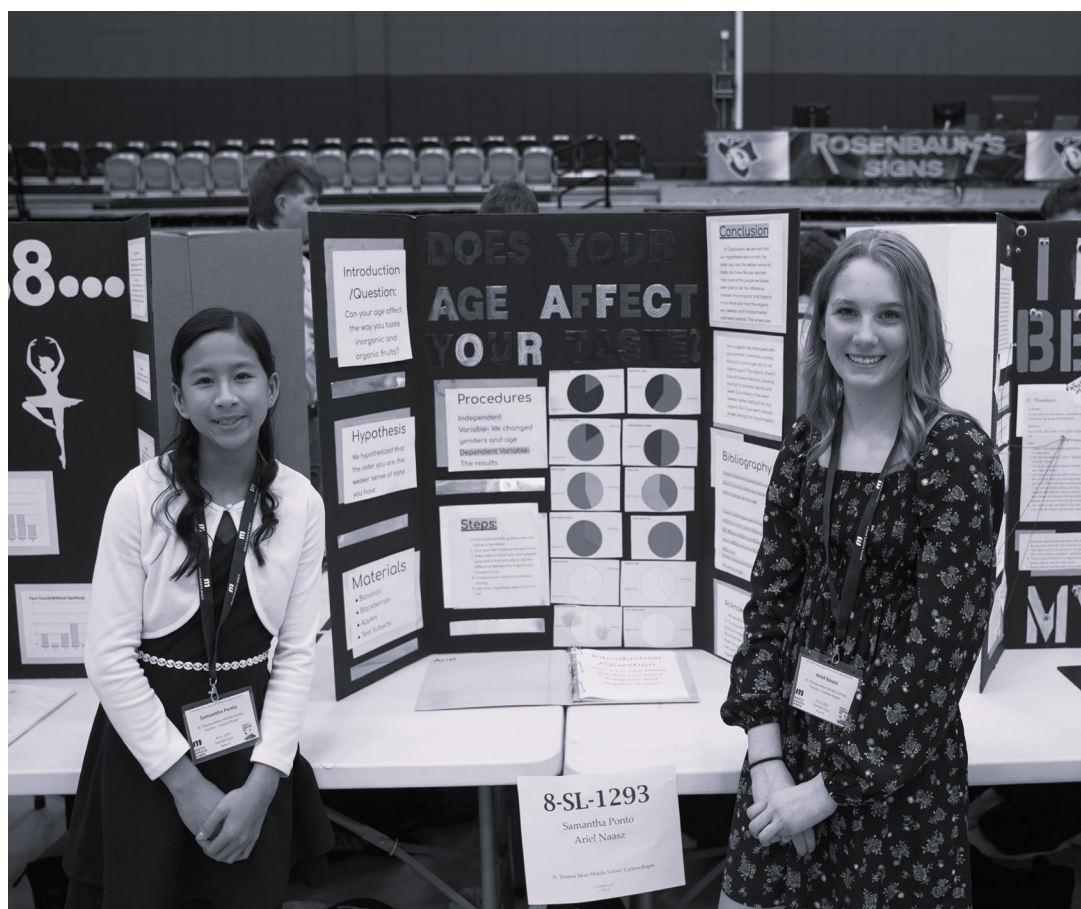
TITLE OF PROJECT		
Problem	Procedure	Results
Hypothesis	Drawings, Photos, Graphs, Charts	Conclusion

JUDGING CRITERIA AND FEEDBACK

A sample of the judging sheet is attached to the end of this guide. It has been revised, so that we can detach the top portion of each judges' sheet and mail them back to teachers following the fair. Our goal is to mail the feedback to you no later than two weeks following the fair.

Judges often have different types of interview styles, but generally, their questions are requesting the same general information. It is helpful to have your students practice introducing themselves and answer some standard questions. For example:

- Tell me about your project.
- For a team project, how did you divide the work?
- What inspired you to choose this project?
- Did anything go wrong during your experiment/design process?
If so, how did you fix it?
- What were the variables you used in your experiment?
- Did you try different types of materials in building your prototype?
- If you had to go back and re-do your project, is there anything you would've done differently and why?
- Did you discover anything that surprised you during your experiment/design?
- Did your conclusion support your hypothesis?
- Do you plan to build off this project for next year?



SPECIAL AWARDS

In addition to the standard awards presented to the top projects in each category, we also present numerous special awards that are provided to us from ISEF and other external organizations. Our registration page for students has been updated to include selection boxes for specific criteria that helps us decide what projects are eligible for each special award. Special judges are recruited for each award and have the option to judge projects relative to their assigned awards during the regular open judging period.

ISEF QUALIFIER

A small panel of special judges is selected to visit the top-scoring student/team in each high school category during the afternoon judging session. The judges vote on what student/team will be named our first place and runner-up qualifiers for ISEF. The student/team who is named the first-place winner(s) will receive an all-expense paid trip (along with a chaperone) to attend ISEF in mid-May. The runner-up will be asked to attend if for some reason the first-place winner(s) is unable to go.

The student/team who qualifies for ISEF must register within two weeks after our regional fair. The fair director will submit the qualifier's information to ISEF and pay the necessary registration fee. Then, the student will receive an email with more information that he/she will need to provide to complete registration.

In preparation for the trip to ISEF, the student(s) will need to have their project display board shipped ahead of time. Typically, the student's school will cover the cost of shipping the project, but will be reimbursed if a receipt is sent to the fair director.

The student(s) who attend ISEF will be mailed a package from the fair director with South Dakota Mines lapel pins to hand out at the ISEF pin exchange. We will also provide a Mines shirt to wear during the fair.

A travel advance is provided to the chaperone accompanying the student(s) to ISEF to cover hotel and shuttle fees. Meals that aren't included in the ISEF schedule will generally need to be covered by the chaperone up front and then will be reimbursed by South Dakota Mines after they return from ISEF. It is important to keep all receipts from the trip to send to the fair director, along with a copy of the ISEF program, to receive full reimbursement.

We request teachers/chaperones take photos of the student(s) throughout ISEF and send them back to the fair director for use on the university's website and/or social media outlets. We also request the student(s) send a short summary of their experience after they return from ISEF to the fair director.

High Plains Regional Science & Engineering Fair Judging Sheet

Exhibit #:		Student Last Name:	
Exhibit Title:			
Notes for Student:			

Rank each area as follows: 5 = Outstanding, 4 = Very Good, 3 = Good, 2 = Partial, 1 = Attempt made, 0 = Absent

1) Scientific Investigation (30 points total)	Points
Problem Stated Clearly	
Problem Challenging	
Followed Problem Precisely	
Demonstrate practicality	
Variables clearly defined	
Enough data for warranted conclusion	
TOTAL for Scientific Investigation	1)

2) Thoroughness (25 points total)	Points
Data and testing extremely thorough	
Understood between project and other approaches – cite references	
Made all attempts to solve stated problem	
Comprehensive log book	
Data supported conclusion	
TOTAL for Thoroughness	2)

3) Skill (10 points total)	Points
Did all actual work	
Executed project well	
TOTAL for Skill	3)

4) Creative Ability/Originality (20 points total)	Points
Original idea	
Approach original	
Data analyzed effectively	
Project design	
TOTAL for Creative Ability/Originality	4)

5) Clarity (10 points total)	Points
Exhibit neat and clear	
Oral and written responses well organized and thorough	
TOTAL for Clarity	5)

6) Interview Score (5 points)	Points
TOTAL for "Interview Score"	6)
GRAND TOTAL (100 points possible)	



SOUTH DAKOTA MINES®

An engineering, science and technology university

**HIGH PLAINS REGIONAL
SCIENCE & ENGINEERING FAIR**

Thank you for helping grow the High Plains Regional Science & Engineering Fair into one of the largest fairs in the state. Our fair is only successful because of the dedication and support of teachers and parents who keep students interested in STEM.

Please visit the HPRSEF website for the most up-to-date information:

sdsmt.edu/ScienceFair