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Denver Metro Regional Science and Engineering Fair

2018-2019 Rules, Policies, and Participation Guide

February 15-17, 2019

University of Colorado Denver

1201 Larimer Street

Denver, CO 80204

Table of Contents

University of Colorado **Denver**

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INTRODUCTION

ABOUT

The annual Denver Metro Regional Science and Engineering Fair (DMRSEF) is in its 56th year. This exciting and challenging competition includes students from the eight-county Denver metropolitan area's middle schools (grades 6-8), high schools (grades 9-12), and home schools (grades 6-12). The DMRSEF is one of Colorado's 13 International Science and Engineering Fair regions. The top winners from the region are eligible to compete in the Colorado State Science Fair. Our region represents the following Colorado counties:

- Adams
- Arapahoe
- Denver
- Douglas
- Broomfield
- Clear Creek
- Jefferson
- Summit

LOCATION

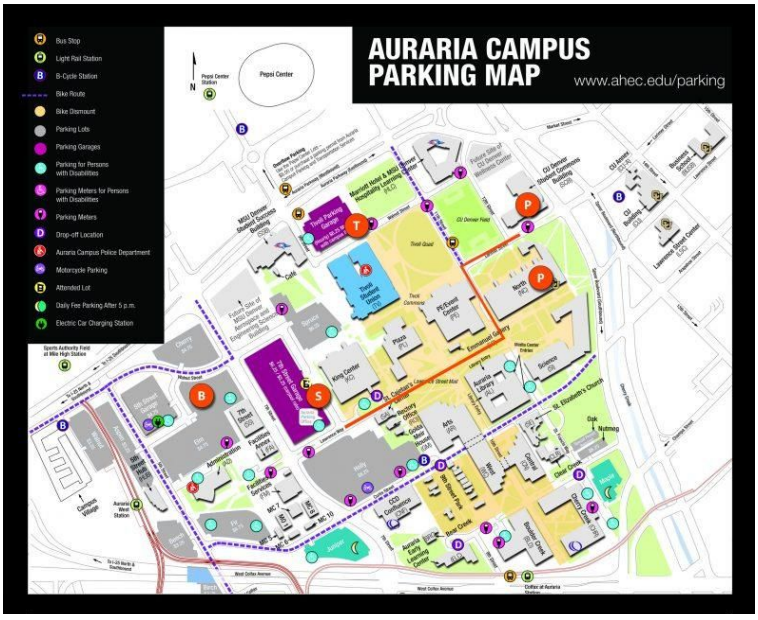
The Denver Metro Regional Science and Engineering Fair is now hosted by the University of Colorado Denver, and will take place over the course of two days and several locations which can be found on the following map:

From I-25, exit Speer Boulevard south.
Our campus is bounded by Speer Boulevard, Auraria Parkway and Colfax Avenue.

Parking is available throughout the campus, for pricing information and details please visit : www.ahec.edu/services-departments/parkingw

To view the interactive campus map please visit: www1.ucdenver.edu/maps/cu-denver-map

To travel via public transportation visit: www.rtd-denver.com/app/plan



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Important Dates and Times

All dates and times listed below are subject to change.
Please visit denversciencefair.com for updates.

Registration

$35 per person/team member if registered by 1.04.19
$45 per person/team member by 1.15.19

November 30, 2018
Registration opens for all students
January 15, 2019
Last day to register for DMRSEF – No exceptions.

Regional Fair

Friday, February 15, 2019
8:30 am – 9:30 am | Student Arrivals: NO STUDENT CHECK-INS
8:30 am – 12:00pm | Project Display & Safety Reviews/Activities/SRC Interviews (if needed)
12:00 pm – 1:00pm | Lunch
1:00 pm – 5:00pm | Project Interviews
3:30 pm – 4:30pm | Teacher/Chaperone Informal Evaluation
5:00 pm | Adjourn

Sunday, February 17, 2019
6:30 pm – 8:30 pm | Awards Presentation

Moving Forward

Colorado Science and Engineering Fair (CSEF)
| Colorado State University, April 11-13, 2019
Intel International Science and Engineering Fair (ISEF)
| Phoenix, Arizona, May 12-17, 2019

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Categories

The categories below are those offered by DMRSEF. These groupings include all ISEF categories, but may be grouped differently as you progress. For a more detailed description of each category, please visit: clas.ucdenver.edu/denversciencefair/FAQ

Animal Sciences (AS)

Animal Behavior, Cellular Studies, Development, Ecology, Nutrition and Growth, Physiology, Systematics Evolution

Behavioral Science (BS)

Clinical & Developmental Psychology, Cognitive Psychology, Neuroscience, Physiological Psychology

Biological Sciences -Biochemistry, Cellular & Molecular Biology (BIO)

Analytical Biochemistry, General Biochemistry, Medicinal Biochemistry, Structural Biochemistry, Disease Detection and Diagnosis, Disease Prevention, Disease Treatment and Therapies, Drug Identification and Testing, Pre-Clinical Studies

Chemistry (CH)

Analytical Chemistry, Computational Chemistry, Environmental Chemistry, Inorganic Chemistry, Materials Chemistry, Organic Chemistry, Physical Chemistry

Computer Sciences -Computational Biology, Bioinformatics, Embedded Systems, Mathematics, Robotics, Intelligent Machines & Systems Software (CMP)

Computational Biomodeling, Computational Epidemiology, Computational Evolutionary Biology, Computational Neuroscience, Computational Pharmacology, Genomics, Circuits, Internet of Things, Microcontrollers, Networking and Data Communications, Optics, Sensors, Signal Processing, Algebra, Analysis, Combinatorics, Graph Theory, Game Theory, Geometry, Topology, Number Theory, Probability and Statistics, Biomechanics, Cognitive Systems, Control Theory, Machine Learning, Robot Kinematics, Algorithms, Cybersecurity, Databases, Human/Machine Interface, Languages and Operating Systems, Mobile Apps, Online Learning

Earth and Environmental Sciences (EV)

Atmospheric Science, Climate Science, Environmental Effects on Ecosystems, Geosciences, Water Science

Energy: Chemical & Physical (EGY)

Alternative Fuels, Computational Energy Science, Fossil Fuel Energy, Fuel Cells and Battery Development, Microbial Fuel Cells, Solar Materials, Hydro Power, Nuclear Power, Solar, Sustainable Design, Thermal Power, Wind

Engineering- Biomedical, Environmental Engineering & Engineering Mechanics (ENG)

Biomaterials and Regenerative Medicine, Biomechanics, Biomedical Devices, Biomedical Imaging, Cll and Tissue Engineering, Synthetic Biology, Aerospace and Aeronautical Engineering, Civil Engineering, Computational Mechanics, Control Theory, Ground Vehicle Systems, Industrial Engineering-Processing, Mechanical Engineering, Naval Systems, Bioremediation, Land Reclamation, Pollution Control, Recycling and Waste Management, Water Resources Management

Materials Science (MS)

Biomaterials, Ceramic and Glasses, Composite Materials, Computation and Theory, Electronic, Optical, and Magnetic Materials, Nanomaterials, Polymer

Medicine & Health Science -Biomedical, Health & Translational Medical Science (MED)

Cell, Organ, and Systems Physiology, Genetics and Molecular Biology of Disease, Immunology, Nutrition and Natural Products, Pathophysiology

Microbiology (MI)

Antimicrobial and Antibiotics, Applied Microbiology, Bacteriology, Environmental Microbiology, Microbial Genetics, Virology

Physics and Astronomy (PA)

Atomic, Molecular, and Optical Physics, Astronomy and Cosmology, Biological Physics, Computational Physics and Astrophysics, Condensed Matter and Materials, Instrumentation, Magnetics, Electromagnetics and Plasmas, Mechanics, Nuclear and Particle Physics, Optics, Lasers, Masers, Quantum Computation, Theoretical Physics

Plant Sciences (PS)

Agriculture and Agronomy, Ecology, Genetics and Breeding, Growth and Development, Pathology, Plant Physiology, Systematics and Evolution

Social Sciences (SS)

Sociology, Social Psychology

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Rules and Regualtions

Ethics Statement

Student researchers are expected to maintain the highest standards of honesty and integrity. Scientific fraud and misconduct are not condoned at any level of research or competition. This includes plagiarism, forgery, use or presentation of other researcher's work as one's own and fabrication of data. Fraudulent projects will fail to qualify for competition at DMRSEF, which reserves the right to revoke recognition of a project subsequently found to have been fraudulent

The purpose of these rules is to

- protect the rights and welfare of the student researcher
- protect the rights and welfare of human participants
- protect the health and welfare of vertebrate animal subjects
- protect and promote good stewardship of the environment
- ensure adherence to federal regulations
- ensure use of safe laboratory practices
- determine eligibility for competition in the Intel ISEF

Eligibility/Limitations

- Each school may send a maximum of two students from the winners of each competition category
- A student must be both in grades 9 –12 or equivalent; and not have reached age 20 on or before the May 1 preceding the Intel ISEF.
- English is the official language of the Intel ISEF. Student project boards and abstracts must be in English.
- Each student is only allowed to enter one project. That project may include no more than 12 months of continuous research and may not include research performed before January 2018.
- Students may only compete in one ISEF affiliated regional fair
- Projects that are demonstrations, 'library' research or informational projects, 'explanation' models or kit building are not appropriate for the Intel ISEF.
- DMRSEF has narrowed down 12 categories which encompass all sciences and engineering disciplines represented at the Intel ISEF. Please review our complete list of categories, as students must compete within a designated category.
- A research project may be a part of a larger study performed by professional scientists, but the project presented by the student must be only their own portion of the complete study.

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DMRSEF Specific Policies

The Denver Metro Regional Science and Engineering fair will follow all the rules provided by the Intel International Science and Engineering Fair. The policies listed below are specific to the regional fair and will be enforced alongside the international rules which can be found here: ***https://ssefflorida.com/wp-content/uploads/2018/07/2019-ISEF-Rules-and-Guidelines.pdf***

- Living organisms, including plants, Mold (even if enclosed), and bacteria are not allowed.
- Glass unless deemed by the Display and Safety Committee to be an integral and necessary part of the project (Example: glass that is an integral part of a commercial product, such as a computer screen) will be permitted. All other glass will not be allowed in displays.
- Human/animal parts or body fluids (for example, blood, urine) will not be allowed at your display, with the exception of teeth, which if professionally decontaminated, may be exhibited in sealed containers.
- Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non-manufactured state will not be permitted. *Exceptions will be made for manufactured construction materials used in building the project or display, for example wood.*
- Any apparatus with belts, pulleys, chains, or moving parts with tension or pinch points are to be appropriately shielded and not be operating.
- Upon registration form 3 is a required form for the denver metro regional science and engineering fair
- students will also be required to turn in a safety waiver for the university of colorado denver to be able to participate at the fair
- Electrical outlets will not be available to power student projects at Denver Metro Regional Science and Engineering Fair. All power necessary must be provided by students in accordance with display regulations.

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Expectations

Students at Denver Metro Regional Science and Engineering Fair are expected to adhere to the following behavioral standards both at the regional fair and any future fairs.

Behavior

Students are expected to conduct themselves in a professional manner throughout the entirety of the fair. Science Fair is meant to be fun and engaging, but it is important to remember that this is an educational environment.

Dress code

Please be prepared to represent yourself, your project, and all your hard work by looking your best and maintaining the standard of professionalism expected of all participants. Name badges are to be worn at all times.

Safety

Students are expected to be aware of all projects and individuals in their surroundings. “Horseplay” as well as any other disruptive, disrespectful, or dangerous behaviors will not be tolerated at the fair.

Moving Forward: CSEF and ISEF

Colorado Science and Engineering Fair (CSEF)

April 11-13, 2019 at Colorado State University
Details can be found here:
csef.colostate.edu

International Science and Engineering Fair (ISEF)

May 12-17, 2019 in Phoenix, Arizona
Details can be found at
student.societyforscience.org/intel-isef

DMRSEF will sponsor the trip of qualifying students to ISEF, with a maximum funding limit of $1500 for an individual or $3000 for a team. Just as before, parents and family members are welcome to attend at their own expense.

Awards

Every year Denver Metro Regional Science and Engineering Fair awards three best in fair awards to both junior and senior division as well as category awards for the best project in any given subject area. Best in show cash awards in previous years have been distributed as follows:

Senior Best in Show:
First Place = $750
Second Place = $500
Third Place = $250

Junior Best in Show:
First Place = $500
Second Place = $250
Third Place = $150

Senior Division Best in Show winners (1st–3rd place) receive an all expense paid trip to compete at ISEF if they qualify to move on at state.

Special awards will be provided by sponsors of the fair. All projects are automatically considered for special awards.

Sample Judging Score Card

Denver Metro Regional Science & Engineering Fair
Judges Personal Rating Card
For INDIVIDUAL Projects
(SIDE TO BE DESTROYED AFTER JUDGING IS COMPLETED)
POINTS RATINGS (100 POINTS MAX)

LOCATION: STUDENT COMMONS 2500 99

PROJECT #: JMED1
PROJECT TITLE: Curious George Completes Research: What Mammal Be

1. **RESEARCH QUESTION** (10 POINTS) –Comments:

2. **DESIGN AND METHODOLOGY** (15 POINTS) – Comments:

3. **EXECUTION:** (up to 20 POINTS) – Comments:
DATA COLLECTION, ANALYSIS, & INTERPRETATION

4. **CREATIVITY** (20 POINTS) –Comments:

5. **POSTER** (10 POINTS)—Comments:

6. **INTERVIEW** (25 POINTS) –Comments:

ADDITIONAL NOTES: **TOTAL POINTS:**

Glossary

Abstract- a brief written summary of a research project that provides any pertinent information in 200-250 words.

Affiliated Fair- a science and engineering fair in which finalists compete in a higher level fair, ultimately leading to the International Science and Engineering Fair (ISEF). Each of the regional fairs in Colorado is affiliated with CSEF; CSEF and each regional fair are additionally affiliated with ISEF.

Alternatives- in the context of research on vertebrate animals in student projects, this refers to substitutes for live animals. The consideration of alternatives is required by the SRC for approval of any projects involving vertebrate animals.

Animal Care Supervisor- an individual that is responsible for the care of all non-human vertebrate animal projects and must be well acquainted with the care and handling of all research animals used in the project.

Approval Forms- forms that must be completed for all projects that involve any restricted areas of research. This includes the names and signatures of all necessary persons giving permission for the project before experimentation begins. The student signature indicates that the student will adhere to both the DMRSEF and ISEF ethics statement.

Bibliography- part of the research plan which lists at least five major references including but not limited to scientific journal articles, books, and internet sites. If vertebrate animals are used, an additional animal care reference is required. This should be in APA format.

Breach of Confidentiality- Providing identifiable or personal information on any subjects involved in the study. To preserve confidentiality is to take the necessary measures to ensure that the research data and/or responses are not disclosed to the public or unauthorized individuals with identifiable information that links the data with a specific individual or group of individuals.

BSL- Biosafety Level. These range from BSL1 to BSL4, only levels one and two are permitted.

Conclusion- a brief summary of how the results of an experiment support or contradict a hypothesis.

Consent Forms- permission from human subjects to have their data collected and used within the confines of your research. Required for all projects that involve human subjects.

Continuation- the act of extending or prolonging research in a given subject or project area; also, a project which may reference prior work, but which follows a new line of investigation. A valid continuing project for the DMRSEF must demonstrate new and different research from that done previously with a new hypothesis/purpose.

Controlled Substances- any substance controlled by the Drug Enforcement Administration, Bureau of Alcohol, Tobacco and Firearms, or Food and Drug Administration including those that are illegal for use by minors.

Data book- a documentation of the work done during an experiment. It includes the findings, called data, collected during an experiment, as well as any observed responses, reactions and results

Demonstration project- a project that retests an experiment already conducted by someone else. A demonstration project can also show how something works. Adding a variable to a demonstration can make it into an experiment.

Designated Supervisor- an adult properly trained in the specific procedures used in the investigation who will directly supervise the student. The Designated Supervisor cannot be the student's parent. A teacher may act in this capacity.

End Date- the complete date (month, day, and year) when laboratory experimentation ceases and/or the date when the allowable twelve-month research period stops.

Ethics Statement- an ethical statement that each student is required to adhere to and sign as part of the research plan and application process.

Failure to qualify- at any point in the competition process DMRSEF has the right to deem your project unsuitable for completion due to violation of DMRSEF rules and expectations.

Graph- a diagram that illustrates a relationship, typically between two variables. Each variable is measured along one of two axes, positioned at right angles.

Hazardous Substance- any dangerous chemical, organism, equipment, or radioactive material that exposes a researcher or research subject to risk or harm.

Human and Vertebrate Animal Tissue- includes viable flesh, tissue, organs, human or animal parts (including blood), blood products, teeth, primary cell cultures, and body fluids. Use of any of the above requires a Form (6A) or Form (6B) and SRC Approval before the beginning of experimentation.

Human Subject- a person who a researcher (professional or student) obtains data from.

Hypothesis research- a proposed explanation for a phenomenon. In science, a hypothesis is an idea that hasn't yet been rigorously tested. Once a hypothesis has been extensively tested and is generally accepted to be the accurate explanation for an observation, it becomes a scientific theory.

IBC- Institutional Biosafety Committee

Identifiable Information- any information that could be used to identify a subject or subjects as participating in a research study. Basic identifiers include names, social security numbers, birth dates, and phone numbers. In some situations, variables such as race and ethnicity may identify a subject when there are very few individuals of a particular race in the sample.

Individual Project- one student working to complete a science project in which one research report is produced. An individual project cannot become a team project within a single year.

Informed Consent- is a process that involves providing detailed information to potential research subjects (and parents/guardians, when appropriate) about the proposed research project so that the potential subjects (and parents/guardians) can make an informed decision about whether to participate. Informed consent procedures require the subject (and the parent/guardian) to sign a DMRSEF Informed Consent Form prior to participation in the research.

Institutional Animal Care and Use Committee (IACUC)- a committee that must approve all animal research within an institution and must supply a copy of the approval document for review by the Scientific Review Committee (SRC).

Institutional Laboratory- a formal, established laboratory within an academic, commercial, medical, or government setting, but not in the home or high school.

Institutional Review Board (IRB)- a committee of specific composition at an affiliated fair, high school or institution that reviews research plans and consent forms to evaluate potential physical or psychological risk of research involving human subjects. Each school must have an IRB to oversee local projects. The regional and state SRC acts as the IRB at those levels.

Invasion of Privacy- stating facts or asking questions that are considered private information (history of abuse, drug use, opinions, fingerprints, genetic material, blood samples, tissue samples, etc.).

Literature research- an organized review of books, articles and published research on a specific topic.

Mentor- a person who helps a student with a project. The mentor may be a teacher, Qualified Scientist, or a person that helps a student with a field research project

Pathogenic Agents- disease-causing or potentially disease-causing agents (including soil bacteria).

Plagiarism- the offering of another's work as one's own by copying, imitating, forging, stealing, etc.

Potential Pathogen- any organism that has or may have the latent ability to cause disease in humans, vertebrate animals or plants.

Project Category- when registering a project, students will select a category which he/she would like to be judged, or best fits the subject matter of their research. Please be aware this categorization will differ from DMRSEF to future fairs.

Project Year- the present project year includes research conducted over a maximum, continuous 12 month period between January of the previous year and ending in May during the year of the Fair.

Qualified Scientist- an individual who possesses (1) an earned doctoral degree in science or medicine or (2) a master's degree with equivalent experience and/or expertise, and who has a working knowledge of the techniques to be used by the student.

RAC- rDNA Advisory Committee

Recombinant DNA (rDNA)- According to the National Institutes of Health (NIH) guidelines, recombinant DNA molecules are either: (1) molecules that are constructed outside living cells by joining natural or synthetic DNA segments to DNA molecules that can replicate in a living cell or (2) DNA molecules that result from the replication of those described.

Regional Fair- there are thirteen regional fairs in the state that feed into the Colorado Science and Engineering Fair. Please see CSEF Website to ensure you are registering with the correct regional fair.

Registered Research Institution- a scientific or medical facility or organization involved in the study and investigation of scientific, medical or engineering topics such as university laboratories, National Institutes of Health (NIH), medical centers, pharmaceutical firms, private foundations and which are registered for grant application with the federal government.

Research Plan- must include the question being addressed, the hypothesis/problem/engineering goals, a detailed description of methods and procedures including chemical concentrations and drug dosages, and a bibliography. See research plan with Student Checklist (1A) or more required information. (Also referred to as the protocol.)

Research Report- paper that organizes data and thoughts. It should include a title page, table of contents, introduction that includes a summary of previous literature review, hypothesis, problem or engineering goals, an explanation of what prompted the research, what the student hopes to achieve, methods and materials, data, graphs, and statistical calculations, discussion, conclusion, acknowledgements, and a reference bibliography.

Results- a statement that explains or interprets the data produced in an experiment.

Risk Determination- the local IRB evaluates the research plan and all materials (surveys, questionnaires, tapes, exercises, etc.) to be used before any experimentation (research) begins. The local IRB evaluates the risk value. Copies of the research plan and all supplementary materials are then sent to the regional and state fair committees for final approval.

Risk- the potential for psychological or physical harm to human subjects as a result of participation in a research project. Risks may be physical in nature (e.g., fatigue, illness, injury, death) or psychological in nature (e.g., emotional stress, invasion of privacy, breach of confidentiality).

Safety Committee- a group of qualified individuals responsible for checking compliance of exhibits with display and safety rules that are active at each fair.

Scientific Fraud or Misconduct- the act of misleading or deceiving others by intentionally falsifying scientific data or statements as research or by misbehavior or improper actions.

Scientific method- a sequence of steps followed in investigating natural phenomena.

Scientific Review Committee (SRC) - a group of qualified individuals that is responsible for evaluation and approval of student research, certifications, research plans, and exhibits for compliance with the DMRSEF Rules and Guidelines.

Special Needs Person- a person regardless of age who has been classified as such according to Title 45CFR, including but not limited to gifted, learning disabled, medically disabled, mentally or emotionally disabled, or mentally compromised (e.g. persons with Alzheimer's disease or Parkinson's disease).

Start Date- the date (month, day, and year) on which actual experimentation and data collection in a project begins, excluding a literature search.

Supervision- direct guidance by a knowledgeable adult in the planning, execution, and evaluation of student research.

Teacher- the researcher's science/engineering/math /computer science teacher of record for the year the project began. This teacher may fill out Form (1) attesting to the fact that he/she has reviewed the Rules and Guidelines, reviewed the student's Forms and Research Plan, and discussed risks involved with the project. The teacher may serve as a Designated Supervisor or Qualified Scientist.

Team Project- two or three students working to complete one science and engineering fair project in which one research report is produced. A team project cannot become an individual project or vice versa within the same project year. Individual research from a previous year can be continued as a team project in future years and vice versa.

Trial- one of a number of repetitions of an experiment.

Variable- in research, something that can be changed or altered during an experiment. Each variable that is to be tested would represent a different test condition

Resources

Intel ISEF Project Database
View abstracts from Intel ISEF finalists since 2003

Isef main webpage

CSEF main webpage

Intel ISEF Rules Wizard
This "wizard" asks a series of questions about your planned project and will provide a list of forms that you need to complete

Scientific Review Committee FAQ's
Common questions about our rules and guidelines from our scientific review committee

Overview of Forms
Provides a brief explanation of each form in the Rules and Regulations, and when it should be completed.

Common Scientific Research Committee (SRC) Problems
Summarizes SRC reviews leading up to the Intel ISEF, with pointers about what NOT to do.

Reasons for Failing to Qualify at Intel ISEF
This document summarizes the most common reasons that a project fails to qualify at the Intel ISEF.

Human Participants Risk Assessment Guide
A document to aid your IRBs in making sound decisions for human participant project approvals and permissions needed.

Intel ISEF Student Handbook
An aid to help in the research process

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A Science Fair Project Resource Guide
How to; samples; ideas & magazines, resources from the Internet Public Library.

Science Fair Projects (FAQ's)
Science fair information related to agriculture and lists of sites relating to science fairs.

Science Fair Resource Center
Ideas, projects, books, tips, display tips, tutorials, sample and winning projects, picture gallery and more.

The "Ultimate Science Fair Resource"
Site index of hints, ideas, links, doing a project, writing reports, etc.

Guide to Filling Out Forms
Site index of hints, ideas, links, doing a project, writing reports, etc.

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Contact us

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Find us on social Media

Facebook: Denver Metro Regional Science and Engineering Fair
Instagram: @DenverScienceFair
Snapchat: @DMRSEF
Twitter: @DMRSEF
#DenverScienceFair #DMRSEF

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Thank you

...to our current and future sponsors for making the Denver Metro Regional Science and Engineering Fair Possible.

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A special thank you to all parents, teachers, administrators, and volunteers for 56 years of support, and counting.