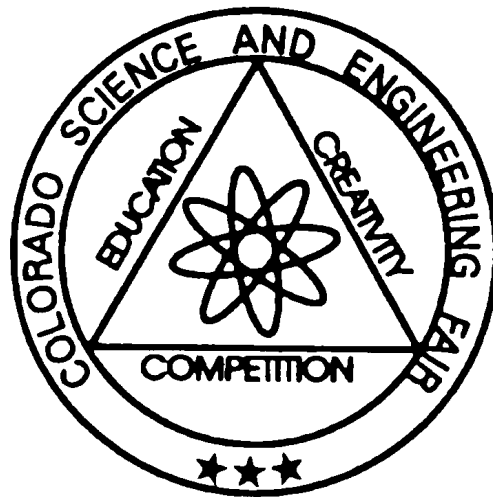


54<sup>th</sup> Annual

# Colorado Science and Engineering Fair

## Grand Awards JUDGING GUIDE



**April 9 - 11, 2009**

Lory Student Center  
Colorado State University  
Ft. Collins, Colorado

# 54<sup>th</sup> Annual Colorado Science and Engineering Fair

Lory Student Center

CSEF Headquarters: Registration Booth, 2<sup>nd</sup> Floor

Colorado State  
University

## Thursday, April 9, 2009

### Finalist Schedule

8:30 AM – 11:00 AM	Tour Ticket Pick-Up/Sales	Room 213/215
8:30 AM – 11:30 AM	SRC Interviews – <i>Students requiring an interview must comply BEFORE project may be set up.</i>	Room 203/205
9:00 AM – 11:00 AM	Finalist Check-In <i>Finalists MUST stay with their exhibit until Display &amp; Safety Check has been done and An Official Photo has been taken. Finalists must be out of the exhibit area by noon.</i>	Registration Booth
1:00 PM – 1:20 PM	Finalist Orientation Meeting – <i>Mandatory for all exhibitors.</i>	CSU Theater
1:30 PM – 5:00 PM	Judging – <i>Students must be at their exhibits for interviews.</i>	Main Ballroom

### Adult Schedule

1:30 PM – 2:00 PM	ISEF Rules Update	Room 213/215
2:00 PM – 3:00 PM	Science Fair Adult Sponsor Workshop <i>Teachers and parents are invited to attend this informal workshop on ways to improve science fair coordination in the classroom. Presented by Candus Muir, The Classical Academy, Colorado Springs</i>	Room 203/205
3:15 PM – 5:00 PM	Intro to Small-Scale Science Workshop <i>Teachers and parents are invited to attend this mini-workshop on using Small-Scale Science in science fair research projects. Presented by Dr. Stephen Thompson, Director of the Center for Science, Mathematics &amp; Technology Education</i>	B322 NESB

### Judging Schedule

10:15 AM – 11:00 AM	Grand Awards Judge Captains' Briefing	Room 230
11:00 AM – 11:30 AM	Grand Awards Judges' Briefing	Cherokee Park Room
11:30 AM – 12:30 PM	Grand Awards Judges' Luncheon	North Ballroom
12:15 PM – 12:30 PM	Special Awards Judges' Briefing	Room 228
12:00 PM – 5:00 PM	Judging	Main Ballroom
12:00 – 1:30 PM	<u>Grand Awards Judges only</u> in the exhibit room.	
12:30 – 1:30 PM	Special Awards Judges may enter the exhibit area. <u>Judges only</u> in the exhibit room.	
1:30 – 5:00 PM	Students will be at their exhibits for interviews.	
5:30 PM	Exhibit area is locked. Final judging continues.	Main Ballroom

**Only Judging Captains and Scientific Review Committee Members are permitted in the exhibit area at this time.**

## Friday, April 10, 2009

10:30 AM – 5:00 PM	CSEF Finalist Exhibits Open to the Public and the Media	Main Ballroom
9:00 AM – 10:00 AM	Guest Speaker: Colorado State Representative, Randy Fischer	CSU Theater
10:30 AM – 3:00 PM	Tours – <i>Finalists, Adult Sponsors, family members and judges are invited to participate in the tours and presentation.</i>	
2:00 PM	Finalist Ballots for Student Choice and Poster Contest are due.	Registration Booth
7:00 PM	Awards Ceremony	Thompson Valley HS

## Saturday, April 11, 2009

9:00 AM – 11:00 AM	CSEF Finalist Exhibits Open to the Public and the Media <i>Finalists MUST be at their projects for interaction with the public.</i>	Main Ballroom
9:00 AM – 11:00 AM	Advisory Council & Regional Fair Directors Meeting – <i>open to all</i>	Room 213/215
11:00 AM – 12:00 PM	Pizza Party - <i>Finalists, Adult Sponsors, family members and judges are invited.</i> <b>Finalists must be present to win door prizes!</b>	Main Ballroom
12:00 PM – 1:00 PM	Exhibit Dismantling - <b>Everything must be out by 1:00 PM.</b>	Main Ballroom
12:00 PM – 2:00 PM	Board of Directors Meeting – <i>open to all</i>	Room 213/215

**The upcoming Intel International Science and Engineering Fair will be in Reno, NV May 10 – 15, 2009.**  
(Dates are subject to change.)

**Next year's Colorado Science and Engineering Fair will be April 8 – 10, 2010.**

# 54<sup>th</sup> Annual Colorado Science & Engineering Fair

## GRAND AWARDS JUDGING SCHEDULE & GENERAL INFORMATION

**DATE:** Thursday, April 9, 2009

**PLACE:** Lory Student Center, Second Floor  
Colorado State University, Fort Collins

### **GRAND AWARDS JUDGING COORDINATOR:**

Gina Holland

Phone: 303-741-7508 (w) 303-885-7902 (cell) 303-987-0377 (h-after 6 p.m)

E-Mail: gina.holland@shawgrp.com

### **SCHEDULE:**

9:00 a.m. - 10:30 a.m.

9:30 a.m. - 10:45 a.m.

10:15 a.m. - 11:00 a.m.

11:00 a.m. - 11:30 a.m.

11:30 a.m. - 12:00 p.m.

12:00 p.m. - 12:30 p.m.

12:30 p.m. - 1:30 p.m.

1:30 p.m. - 5:00 p.m.

3:00 p.m. - 3:30 p.m.

**3:30 p.m.**

4:30 p.m. - 5:30 p.m.

5:15 p.m. - 5:30 p.m.

5:15 p.m. - 5:30 p.m.

**5:30 p.m.**

5:45 p.m. - 8:30 p.m.

**8:30 p.m.**

**PARKING/SHUTTLE** and arrival to Lory Student Center  
**CHECK-IN**, pick up name tag and program, **Cherokee Park Room**

**Team Captains' BRIEFING**, Room 230

**Judges' BRIEFING**, Cherokee Park Room

**Judges' LUNCHEON**, North Ballroom

**JUDGING without students**

(Grand Award Judges only) Main Ballroom (Exhibit maps will be provided at the Briefing)

Judging without students continues.

(Special Award judges may now enter exhibit areas)

**INTERVIEW STUDENTS** at their exhibits

**Category Judging Team MEETINGS** to select Category's Best Team Project Nominee(s) for Best Team Project Award judging

**TEAM PROJECT JUDGING REPS** for each category meet in **CHEROKEE PARK ROOM** with the Judging Coordinator to start **Best Team Project** interviews, judging and award selection

Category Judging Team MEETINGS to select Category's Individual Project Awards.

**CATEGORY TEAM CAPTAINS** Report Results for Individual Project Awards & Team Award Nominees in each category

**TEAM PROJECT JUDGING TEAM CAPTAINS** report BEST TEAM Project Awards for Junior and Senior Divisions.

**ALL-FAIR JUDGES (CAPTAINS)** meet in **CHEROKEE PARK ROOM** with the **Judging Coordinator**.

All-Fair judging teams complete judging for the BEST INDIVIDUAL Project Award winners for Junior and Senior Divisions.

**ALL-FAIR TEAM CAPTAINS** report judging results.

### **QUESTIONS OR PROBLEMS:**

A Fair Official will be in the **Fair Headquarters** during the judging period. The **Judging Coordinator** will be available in the exhibit areas, and/or Cherokee Park Room, during the judging period.

## **CSEF DIVISIONS**

Projects may be in any field of science, engineering, or mathematics/computer science. The projects must represent the work of a single individual or a team of 2 or 3 students. For competition, projects will be grouped into the following divisions by scholastic grade level:

**Junior Division** (Grades 6 - 8)

**Senior Division** (Grades 9 - 12)

Only the **Senior Division** is eligible to participate in the International Science & Engineering Fair.

## **CSEF CATEGORIES**

Projects may be entered in any one of TWELVE (12) science and engineering categories. The category the exhibit is entered in is primarily the choice of the student/team at the direction of his/her sponsor or Regional Fair Director. Prior to the Fair, the CSEF Scientific Review Committee (SRC) and/or the Grand Awards Judging Captains may re-categorize a project per the procedure outlined in the **CSEF Policy Regarding Category Changes**.

Individual students and Teams may enter a project into any one of the **twelve (12) CONTENT Categories**: Animal Sciences, Behavioral & Social Sciences, Chemistry, Earth & Space Sciences, Energy & Transportation, Engineering, Environmental Sciences, Mathematics & Computer Sciences, Medicine & Health, Microbiology, Physics, and Plant Sciences:

**ANIMAL SCIENCES:** The study of animals (vertebrates and invertebrates). For example - animal development, animal ecology, animal genetics, animal husbandry, animal pathology, animal physiology, animal systematics, biochemistry related to animals, animal cellular & molecular biology, etc.

**BEHAVIORAL & SOCIAL SCIENCES:** The science or study of the thought processes and behavior of humans and other animals in their interactions with the environment, studied through observational and experimental methods. For example – clinical & developmental psychology, cognitive psychology, physiological psychology, sociology, etc.

**CHEMISTRY:** The study of the composition, structure, properties and reactions of matter, especially of atomic and molecular systems. For example – analytical chemistry, inorganic chemistry, organic chemistry, physical chemistry, general chemistry, general biochemistry, biochemical metabolism, structural biochemistry, etc.

**EARTH & SPACE SCIENCES:** The study of sciences related to the Earth and anything in the universe beyond the Earth. For example – climatology, weather, geochemistry, geology, petrology, mineralogy, paleontology, geophysics, landforms, tectonics, theoretical or computational astronomy, observational astronomy, cosmology, etc

**ENERGY & TRANSPORTATION:** The study of renewable energy sources, energy efficiency, clean transport and alternative fuels. For example – aerodynamics, alternative fuels, fossil fuel energy, vehicle development, solar energy, renewable energy, etc.

**ENGINEERING:** The application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical structures, processes and systems. For example – bioengineering, civil engineering, construction engineering, chemical engineering, industrial engineering and processing, material science, electrical engineering, computer engineering, mechanical engineering, aerospace & aeronautical engineering, thermodynamics, robotics, etc.

**ENVIRONMENTAL SCIENCES:** The study of pollution sources and their control, ecology and conservation. For example – air pollution & quality, soil contamination & quality, water pollution & quality, bioremediation, ecosystem management, environmental engineering, land resource management, forestry, recycling, waste management, etc.

**MATHEMATICS & COMPUTER SCIENCES:** The study of the measurement, properties and relationships of quantities and sets, using numbers and symbols. The deductive study of numbers, geometry and various abstract constructs or structures. The study of information processes, the structures and procedures that represent processes and their implementation in information processing systems. For example – algebra, analysis, applied mathematics, geometry, probability & statistics, algorithms, data bases, artificial intelligence, networking & communications, computational science, computer graphics, software engineering, programming languages, computer systems, operating systems, etc.

**MEDICINE & HEALTH:** The science of diagnosing, treating or preventing disease and other damage to the body or mind. For example -- dentistry, pathology, nutrition, allergies, blood, protein & food chemistry, epidemiology, human genetics, molecular biology of diseases, human physiology & pathophysiology, biochemistry related to humans, human cellular & molecular biology, immunology, etc.

**MICROBIOLOGY:** The study of micro-organisms and antibiotic substances. For example – antibiotics, antimicrobials, bacteriology, microbial genetics, virology, etc.

**PHYSICS:** The study of matter and energy and the interactions between the two. For example – atoms, molecules, solids, biological physics, instrumentation & electronics, magnetics & electromagnetics, nuclear & particle physics, optics, lasers, masers, theoretical physics, etc.

**PLANT SCIENCES:** The study of plant life. For example -- agriculture/agronomy, plant development, plant ecology, plant genetics, photosynthesis, plant physiology (molecular, cellular & organismal), plant systematics, plant evolution, biochemistry related to plants, horticulture, etc.

## **CSEF POLICY REGARDING CATEGORY CHANGES**

The purpose of this policy is to facilitate the proper categorization of projects entered in the Colorado Science and Engineering Fair (CSEF) and to allow for a process to move projects between categories if required.

- 1) The category descriptions used by the International Science and Engineering Fair (ISEF) will be used by the CSEF. If CSEF designated categories do not coincide with those of ISEF, the appropriate combined descriptions will apply.
- 2) The CSEF Director will review the ISEF descriptions annually when the new *International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs* are available to assure the descriptions used by CSEF are appropriate.
- 3) The CSEF Director will communicate to Regional Fair directors the policies regarding categorization of projects. This information will also be communicated to the judging captains via the Grand Awards Judging Coordinator.
- 4) The Scientific Review Committee (SRC), as part of the normal project review process, will examine all projects for proper categorization. Projects that are not properly categorized will be re-categorized. The CSEF Director will communicate the re-categorization to the appropriate Regional Fair director.

- 5) After SRC review, project abstracts will be forwarded to the Grand Awards Judging Coordinator for distribution to category judging captains for reviewing prior to the CSEF. Should the category of a project come into question upon review of the abstract by a judging captain or by referral from CSEF personnel, the appropriate judging captains (current category captain and proposed category captain) will review the project prior to the start of judging. Only the judging captains may effect movement of a project to another category after the SRC review. Discipline scientists may be consulted with if deemed necessary by the judging captains. All such changes in categorization will be communicated to the CSEF Director by the Grand Awards Judging Coordinator or designee.
- 6) The CSEF Director will communicate the re-categorization to the appropriate Regional Fair director.
- 7) Category placement will be considered final when judging commences.

# **CSEF STUDENT PROJECT RULES**

## **Pre-Judging Activities**

Each project in the Colorado Science and Engineering Fair (CSEF) must conform to the CSEF Rules which include all the rules of the "International Rules for Pre-College Science Research: Guidelines for Science Fairs" with a few modifications. The most significant in terms of judging, are that the CSEF does not offer as many categories as the International Science and Engineering Fair (ISEF), and more grades are eligible to participate. The CSEF accepts entries from participants in grades 6-12. All student finalists at CSEF are top award winners from the thirteen affiliated Regional Science Fairs in Colorado.

There are very stringent ISEF rules, documentation, and adult/scientific supervision requirements for all projects, but particularly those using Human Subjects, Nonhuman Vertebrate Animals, Pathogenic Agents and Controlled Substances, Recombinant DNA, Human and Animal Tissue, and Hazardous Substances or Devices.

As a CSEF JUDGE it is **NOT** your responsibility to assure that the students have met all the CSEF/ISEF rule requirements. This is the role of two CSEF Committees who review project registration documents prior to the Fair and review the exhibits/displays once they arrive on-site at the CSEF.

The information provided below is to give you a basic understanding of the roles of other committees:

## **SCIENTIFIC REVIEW COMMITTEE (SRC)**

The Scientific Review Committee at the the Regional Fair or the local fair reviews the research plan of every project at the time of the local/regional fairs and some projects prior to experimentation. The CSEF SRC reviews the research plans of each exhibit prior to the State Fair. Any projects without the required signatures and forms will not be approved for exhibit in the CSEF.

## **DISPLAY AND SAFETY COMMITTEE**

At the CSEF, the Display and Safety Committee and the State SRC will check and verify each exhibit for compliance with rules and for safety. During set up time, participants **MUST** stay at their project until the SRC/Display Committee check-off is completed.

**Exhibits not conforming must be corrected or removed before judging begins.** Decisions of these Committees and the CSEF Board are final. However, if during judging, you have any concerns or questions regarding a particular projects conformance to CSEF rules, please notify the Judging Coordinator immediately.

## **Student's Research Notebook/Required Forms**

Each project must display, for judging, a Research Notebook. CSEF/ISEF forms that you will see in the project notebook will/may include any or all of the following depending on the type of project:

- \* Abstract (250 word maximum; 1-page)
- \* Checklist for Adult Sponsor/Safety Assessment Form
- \* Research Plan
- \* Research Plan Attachment
- \* Approval Form
- \* Registered Research Institutional/Industrial Setting Form
- \* Qualified Scientist Form
- \* Designated Supervisor Form
- \* Human Subjects Form
- \* Informed Consent Form
- \* Nonhuman Vertebrate Animal Form
- \* Human and Animal Tissue Form
- \* Continuation Projects Form

**JUDGES SHALL NOT WRITE IN OR REMOVE STUDENT'S RESEARCH NOTEBOOK**

## **CSEF Animal Research Guidelines**

The legitimate use of animals in science fair research projects presupposes two postulates: first, the use of animals for learning is morally acceptable; and second, that humans have a responsibility to grant the animals used every humane consideration for their comfort and well being. The proper care and use of animals is a prime concern that cannot be ignored.

The use of protista and other invertebrates is to be encouraged for most research involving animals. Their wide variety and the feasibility of using larger numbers than is usually possible with vertebrates make them especially suitable. This is not to say that the use of vertebrate animals should be prohibited. Certain forms of investigation can only be done with vertebrates. Under proper supervision, students should be permitted to use vertebrates in research.

Research must be conducted with a respect for life and an appreciation of humane considerations that must be afforded all animals. Surgical procedures in vertebrate animals will only be done within academic, hospital, clinical, or research facilities to assure proper equipment and supervision. This is intended specifically to prohibit such procedures at home.

To provide humane treatment of animals, an animal care supervisor who is knowledgeable in the proper care and handling of laboratory animals must assume primary responsibility for the conditions under which the animals are maintained. Vertebrate Animal forms must accompany the CSEF registration verifying these procedures have been followed.

## **Parents and Adult Sponsors**

Parents and adult sponsors are coaches and supervisors for the duration of the student's project. They are to teach the "how to's", but the student must do the work.

## **CSEF RULES AND STUDENT HANDBOOK**

If you are interested in more detailed information about the student rules, a limited number of the CSEF and ISEF Rules and student handbook will be available for the judges' reference at the Fair from the Judging Coordinator.

You can also get copies of the rulebook from the **CSEF WEB SITE**

**<http://www.csef.colostate.edu>**

# **JUDGING GUIDELINES**

## **Evaluation Criteria**

Grand Awards Judging is conducted using a 100 point scale with points assigned to creative ability, scientific thought or engineering goals (II.a and II.b respectively), thoroughness, skill, and clarity. Team projects have a slightly different balance of points that includes points for teamwork. A chart of these point values is located at the end of these criteria. Following is a list of questions for each criteria that can assist you in interviewing the students and aid in your evaluation of the student project.

### **I. Creative Ability (Individual - 30, Team - 25)**

- 1) Does the project show creative ability and originality in the questions asked? the approach to solving the problem? the analysis of the data? the interpretation of the data? the use of equipment? the construction or design of new equipment?
- 2) Creative research should support an investigation and help answer a question in an original way. The assembly of a kit would not be creative unless an unusual approach was taken. Collections should not be considered creative unless they are used to support an investigation and to help answer a question in an original way.
- 3) A creative contribution promotes an efficient and reliable method for solving a problem. When evaluating projects, it is important to distinguish between gadgeteering and ingenuity.

### **II.a. Scientific Thought ( Individual - 30, Team - 25)**

(If an engineering project, the more appropriate questions are those found in IIb. Engineering Goals)

- 1) Is the problem stated clearly and unambiguously?
- 2) Was the problem sufficiently limited to allow plausible attack? One characteristic of good scientists is the ability to identify important problems capable of solutions. Neither working on a difficult problem without getting anywhere nor solving an extremely simple problem is a substantial contribution.
- 3) Was there a procedural plan for obtaining a solution?
- 4) Are the variables clearly recognized and defined?
- 5) If controls were necessary, did the student recognize their need and were they correctly used?
- 6) Are there adequate data to support the conclusions?
- 7) Does the student or team recognize the data's limitations?
- 8) Does the student/team understand the project's ties to related research?
- 9) Does the student/team have an idea of what further research is warranted?
- 10) Did the student/team cite scientific literature, or only popular literature (i.e., local newspapers, Reader's Digest).

### **II.b. Engineering Goals (Individual - 30, Team - 25)**

- 1) Does the project have a clear objective?
- 2) Is the objective relevant to the potential user's needs?
- 3) Is the solution workable? Unworkable solutions might seem interesting, but are not practical. acceptable to the potential user? Solutions that will be rejected or ignored are not valuable. economically feasible? A solution so expensive it cannot be used is not valuable.
- 4) Could the solution be utilized successfully in design or construction of an end product?
- 5) Is the solution a significant improvement over previous alternatives?

- 6) Has the solution been tested for performance under the conditions of use?

### **III. Thoroughness (Individual - 15, Team -12)**

- 1) Was the purpose carried out to completion within the scope of the original intent?
- 2) How completely was the problem covered?
- 3) Are the conclusions based on a single experiment or replication?
- 4) How complete are the project notes?
- 5) Is the student/team aware of other approaches or theories concerning the project?
- 6) How much time did the student or team spend on the project?
- 7) Is the student/team familiar with scientific literature in the studied field?

### **IV. Skill (Individual - 15, Team - 12)**

- 1) Does the student/team have the required laboratory, computation, observational and design skills to obtain supporting data?
- 2) Where was the project performed? (i.e., home, school laboratory, university laboratory) Did the student or team receive assistance from parents, teachers, scientists or engineers?
- 3) Was the project completed under adult supervision, or did the student/team work largely alone?
- 4) Where did the equipment come from? Was it built independently by the student or team? Was it obtained on loan? Was it part of a laboratory where the student or team worked?

### **V. Clarity (Individual - 10, Team - 10)**

- 1) How clearly does the student discuss his/her project and explain the purpose, procedure, and conclusions? Make allowances for nervousness. Watch out for memorized speeches that reflect little understanding of principles.
- 2) Does the written material reflect the student or team's understanding of the research? (Take outside help into account.)
- 3) Are the important phases of the project presented in an orderly manner?
- 4) How clearly are the data presented?
- 5) How clearly are the results presented?
- 6) How well does the project display explain the project?
- 7) Was the presentation done in a forthright manner, without cute tricks or gadgets?
- 8) Did the student/team perform all the exhibit work, or did someone help?

### **VI. Teamwork (Team Projects only - 16)**

- 1) Are the tasks and contributions of each team member clearly outlined? How did you delegate responsibilities between each of the team members?
- 2) Did you designate one person to be the team leader? If so, what were his/her responsibilities? Do you feel that a team leader is a necessary component for a team project? Why/why not?
- 3) Was each team member fully involved with the project, and is each member familiar with all aspects? How did you approach other team members to make sure the work got done?
- 4) Did you find it difficult finding the time to work together? What actions did you take to assure that you met as often as necessary to complete the project?

5) Does the final work reflect the coordinated efforts of all team members?

EVALUATION CRITERIA	INDIVIDUAL PROJECTS	TEAM PROJECTS
Creative Ability	30 points	25 points
Scientific Thought/Engineering Goals	30 points	25 points
Thoroughness	15 points	12 points
Skill	15 points	12 points
Clarity	10 points	10 points
Teamwork	-----	16 points
<b>TOTAL POSSIBLE SCORE</b>	<b>100 points</b>	<b>100 points</b>

### Rating Cards

A two-part blank Rating Card for each project will be provided by the Judging Coordinator for use by the judges in the selection process. There will be separate rating cards available for Individual Projects and Team Projects that will have the correct weighting for each criteria pre-printed on the card. A sample rating card for Individual and Team projects is provided at the end of this section.

The "**JUDGE'S PERSONAL RATING CARD**" portion of this card will be for your point assignment and comments to assist you in ranking the projects. This portion will be **FOR YOUR USE ONLY and DESTROYED when judging is complete.**

The "**JUDGE'S COMMENT CARD - STUDENT'S COPY**" portion is reserved for Judge's comments to the students. This portion of the form will provide judges or teams with an additional mechanism beyond the interview to get their comments back to the students. Although it is not required that comment cards be completed, it is **STRONGLY RECOMMENDED that as a minimum each team fill out one sheet per project with composite remarks.** An alternate method to assure one comment card per project, is to assign each judge on the team a set of projects for which they will complete a comment card.

If you individually or as a team decide to utilize the Judge's Comment Card, please **USE THE PRE-PRINTED PROJECT NAME LABELS** provided, or **COMPLETE the Student's Name, Division, and Exhibit Number** & add your comments. Remember to keep your comments **CONSTRUCTIVE and ENCOURAGING** and do not give the students any information on the points you awarded.

**DO NOT GIVE THE COMMENT CARDS TO THE STUDENTS DIRECTLY OR LEAVE THEM AT THE STUDENTS DISPLAYS.**

**TURN IN** the Comment Cards in the box provided in the Judging Conference Area. These will be given to the students by the Judging Coordinator on the last day of the Fair. You may turn in the complete two-part card. The Judging Coordinator will separate and destroy the Judge's Personal Rating Card portion.

**COLORADO SCIENCE & ENGINEERING FAIR**  
**JUDGE'S PERSONAL RATING CARD**  
**FOR INDIVIDUAL PROJECTS**  
(**Destroy** this portion of the card after  
judging is completed)

EXHIBIT NO.

EXHIBIT TITLE:

\*\*\*\*\*

POINT RATINGS  
(100 Maximum)

1. **Creative Ability** (30 points)

Comments:

2. **Scientific Thought/  
Engineering Goals** (30 points)

Comments:

3. **Thoroughness** (15 points)

Comments:

4. **Skill** (15 points)

Comments:

5. **Clarity** (10 points)

Comments:

**TOTAL**

ADDITIONAL NOTES:

**COLORADO SCIENCE & ENGINEERING FAIR**  
**JUDGE'S COMMENT CARD - STUDENT'S COPY**  
**FOR INDIVIDUAL PROJECTS**  
(**Return** this completed portion of the card to  
**the Judging Coordinator**)

STUDENT NAME:

EXHIBIT NO.:

PLACE PRE-PRINTED LABEL WITH  
STUDENT'S PROJECT INFO HERE

EXHIBIT TITLE:

\*\*\*\*\*

1. **Creative Ability**

Comments:

2. **Scientific Thought/Engineering Goals**

Comments:

3. **Thoroughness**

Comments:

4. **Skill**

Comments:

5. **Clarity**

Comments:

ADDITIONAL COMMENTS:

**COLORADO SCIENCE & ENGINEERING FAIR  
JUDGE'S PERSONAL RATING CARD  
FOR TEAM PROJECTS**

(**Destroy** this portion of the card after  
judging is completed)

EXHIBIT NO.

EXHIBIT TITLE:

\*\*\*\*\*

POINT RATINGS (100 Maximum)

1. **Creative Ability** (25 points)

Comments:

2. **Scientific Thought/  
Engineering Goals** (25 points)

Comments:

3. **Thoroughness** (12 points)

Comments:

4. **Skill** (12 points)

Comments:

5. **Clarity** (10 points)

Comments:

6. **Teamwork** (16 points)

Comments:

**TOTAL**

ADDITIONAL NOTES:

**COLORADO SCIENCE & ENGINEERING FAIR  
JUDGE'S COMMENT CARD - STUDENT'S COPY  
FOR TEAM PROJECTS**

(**Return** this completed portion of the card to  
the **Judging Coordinator**)

STUDENT NAME:

EXHIBIT NO.

**PLACE PRE-PRINTED LABEL WITH  
STUDENT'S PROJECT INFO HERE**

EXHIBIT TITLE:

\*\*\*\*\*

1. **Creative Ability**

Comments:

2. **Scientific Thought/Engineering Goals**

Comments:

3. **Thoroughness**

Comments:

4. **Skill**

Comments:

5. **Clarity**

Comments:

6. **Teamwork**

Comments:

ADDITIONAL COMMENTS:

## **JUDGING TIPS & CAUTIONS**

- 1) Students may have worked on a research project for more than one year. However, for the purpose of judging, **ONLY** research conducted since the last CSEF is to be evaluated. Although previous work is important, it is not to be considered as part of this year's CSEF project.
- 2) Examine the quality of the student's work, and how well the student understands his or her project and area of study. The physical display is secondary to the student's knowledge of the subject.
- 3) Judges should evaluate the project on the basis of how well the student/team followed the scientific method, the detail and accuracy of the research data book, and whether the experimental procedures were used in the best possible way. Utilize the Judging Criteria provided as the basis to evaluate the projects. **Be very careful NOT to include IRRELEVANT and INAPPROPRIATE criteria such as school size, access to well-equipped laboratories, student's gender, race, physical disabilities, etc. in your evaluation of the project work.** The project and student's knowledge of the project must stand on its own merit.
- 4) When research is conducted in an industrial or institutional setting, the student is required to include the ISEF Form 1C with the project documentation. Judges should review in detail supervisors comments on Form 1C when evaluating research conducted in an industrial or institutional setting.
- 5) Look for evidence of laboratory, field or theoretical work, not just library research or gadgeteering.
- 6) Compare projects only with those competing in the CSEF and not with projects seen in other competitions or scholastic events.
- 7) Judges should keep in mind that the CSEF is not only a competition, but an educational and motivating experience for students. The high point of the fair experience for many students is their judging interviews.
- 8) As a general rule, judges represent professional authority to students. For this reason, judges should use an **ENCOURAGING** tone when asking questions, offering suggestions or giving constructive criticism. Judge should not criticize, treat lightly, or display boredom toward projects they personally consider unimportant. Be careful of off-hand negative remarks/opinions about technologies and their success rate near the students. They can take these very personally and may likely stifle their future creativity and interest in science. Always give credit to the student for completing a challenging task. The CSEF would like to provide encouragement for continued effort to **all participants**.
- 9) **CONFLICT OF INTEREST:** If, since the time you registered to be a judge, your situation has changed and your student or child is a CSEF exhibitor or there is any other conflicting circumstance (Regional Fair Director, Student Sponsor, close friend, etc.) it is your responsibility to **notify the Judging Coordinator** to discuss possible reassignment to a non-conflicting category or division and/or resignation as a judge, **prior to the Fair, if possible.**
- 10) Please do not discuss projects in hallways, restrooms, restaurants, or elsewhere, as students or adult escorts might overhear. There is much curiosity at a Science Fair, and your Judge's badge will attract attention to off-hand comments. Similarly, be careful with any notes you take. Results are CONFIDENTIAL until announced at the Friday night awards session.
- 11) **DO NOT TAKE STUDENTS' NOTEBOOKS OR OTHER PARTS OF DISPLAY OUT OF THEIR PROJECT AREA. DO NOT WRITE ON STUDENTS' NOTEBOOKS OR DISPLAYS.**
- 12) Even though the judging schedule is hectic, please **MAKE EVERY EFFORT TO TREAT THE STUDENT FINALISTS WITH RESPECT AND COURTESY AND DON'T RUSH THROUGH THE INTERVIEW.** Please treat your **FELLOW JUDGES** with respect and courtesy.

## **CSEF AWARDS**

Everyone who develops and exhibits a project at the Colorado Science & Engineering Fair is already a winner. All of these Finalists have already competed and won the opportunity to represent their region and participate at the State level. In honor of this achievement, each Finalist receives a pin embossed with the CSEF logo, a Certificate of Participation, and a CSEF Finalist T-Shirt. In addition, there are two judging programs that operate simultaneously at CSEF. The **Special Awards** and the **CSEF Grand Awards** programs. It is important to understand that they both operate very differently.

### **Special Awards and Scholarships**

In this program, over 50 professional, scientific, engineering, and federal organizations send their own judges and use their own criteria to select special award winners. The awards range from college scholarships, cash awards, summer jobs, equipment, plaques, books, medals, trophies, to subscriptions and certificates. Some companies also give awards and recognition to the winners' teachers and schools.

The Special Award Program judging will occur simultaneously with the Grand Awards judging. The Special Award judges will be asked to defer access to the projects and the students for interviews to the Grand Award Judges. However, all judges are asked to cooperate with one another to assure that all judging is accomplished in the allotted time.

### **Grand Awards**

For **Individual Projects** in each of the twelve **Content Categories** in both the Junior and Senior Divisions, **THREE CASH AWARDS**, medals and certificates shall be given for First (\$125), Second (\$75), and Third Place (\$50).

Honorable Mention Awards may be awarded for up to 20% of the number of entrants (individual projects) in each category. The number of honorable mention awards is left to the discretion of the grand awards judging teams. Honorable Mention Awards are a ribbon and certificate per student. Honorable Mention Awards can only be given if First, Second, and Third Place have all been awarded in a category.

For **Team Projects**, zero, one or two projects may be nominated for inclusion in the candidate pool for the Best Team Project Awards. Each Team Project nominated from its respective category will receive a cash award of \$30 and a certificate. In both the Junior and Senior Division, **THREE CASH AWARDS**, medals and certificates shall be given for First (\$125/team), Second (\$75/team) and Third (\$50/team) Places. In addition, in the Senior Division ONLY, the First Place team will be awarded an all-expense paid trip to compete in the Intel International Science and Engineering Fair (Intel/ISEF) and the Second Place team will be the alternate to compete at the ISEF. In addition to the Best Team Project Place Awards, there may be one Team Project Honorable Mention award per Division.

**One Ralph Desch Memorial Technical Writing Award** (\$100) is presented in the Senior Division only.

### **NO TIES ARE ALLOWED for the First, Second or Third Place Awards.**

From the Individual Category Grand Awards are chosen the Best-of-Fair (All-Fair) Grand Awards. Overall First, Second and Third place awards are chosen for each of the Junior and Senior Divisions. The top three Finalists in the Senior Division are awarded all-expense paid trips to compete (1<sup>st</sup> & 2<sup>nd</sup>)/observe (3<sup>rd</sup>) in the Intel International Science and Engineering Fair (Intel/ISEF).

As a Grand Awards judge you are expected to utilize the Judging Criteria, Guidelines and Procedures specified herein to select the awards as noted. A Judging Team assignment list will be provided separately.

A preliminary team assignment list will be compiled and distributed prior to the actual Fair. You have been assigned to a team based on the judges information form you submitted to the Judging Coordinator. As more information is received regarding numbers of projects per category and as judge cancellations, additions, and/or substitutions occur, a final team assignment list will be compiled and available at the Judges' Check-In.

## **CSEF GRAND AWARD JUDGING PROCESS**

Be sure you are familiar with the material on judging supplied to you. This process is suggested as it is not possible to set up specific, finite criteria for judging. The judging of exhibits is basically the process of determining the merits of each exhibit as compared with other competing exhibits. Judging is done on a relative and not an absolute basis. In establishing a "frame of reference" for evaluating exhibits, bear in mind that these are junior and senior high school students and not Ph.D. candidates nor professional scientists. More leniency and latitude must be allowed, and judges should not be unduly critical of minor errors in the students' work if the basic objectives and intent are clearly evident. The various elements to be used in judging and the relative weights of the elements as shown on the rating cards should be kept in mind while judging. The Judging Criteria and weights have been adopted from the International Science and Engineering Fair (ISEF).

### **Grand Award Judging Procedure**

This procedure is suggested as a guide to assist in judging, but any other procedures which individual judges desire to use and which will get the job done are acceptable. Each judge should make his/her individual judging appraisal first. To establish the composite judgment of multiple judging teams in a category, some give and take of initial individual and team judgments must be expected. In discussing differences in selection, the basic merits of the exhibits must be the primary consideration.

The **Team Captain** is responsible for coordinating times for the team members to meet back for discussion, facilitating productive discussion, and assuring that all judging team members' comments are considered equally in the decision process. **Please keep in mind that the judging process and discussion is not a competition between the judges. Treat each other with respect and courtesy. If significant problems develop during the judging please notify the Judging Coordinator IMMEDIATELY to assist with resolution.**

The following procedure is suggested. As stated each team may develop a procedure which is workable for your team:

- 1) Affix the **PRE-PRINTED PROJECT ID LABELS** provided for your assigned projects with the student name(s), Exhibit No. and Exhibit Title on the **JUDGE'S PERSONAL RATING CARDS**. A supply of cards will be available at Check-In in the Judges' Briefing Room and the exhibit areas during judging.
- 2) Each judging team will be seated together at the Judges' Briefing and Luncheon which will afford an opportunity to meet and establish/discuss general strategy and schedule for their team prior to entering the exhibit area. The **CHEROKEE PARK ROOM (or other designated Judges' conference areas)** are to be used for the judging teams to hold conferences throughout the day. **DO NOT USE FAIR HEADQUARTERS or other areas not designated for judges' conferences.**
- 3) 

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At noon, students will exit the exhibit area and judges will be allowed to enter and view the projects without the students present. To form some basis for judging, it is advisable that each judge observe all the exhibits in the category to form a general "frame of reference" for evaluating the assigned exhibits. This is also the only opportunity you will have to look at the project research reports and displays in some detail.
- 4) The students will re-enter the exhibit area at 1:30 p.m. and will be at their exhibits for interviews. Interviews should be conducted by each judge individually whenever possible. **ALL STUDENTS MUST BE INTERVIEWED BY AT LEAST THREE GRAND AWARDS JUDGES (or ALL judges on the team if less than three total judges)**, and as many members of the Judging Team should interview each student as possible. Please give all students under consideration roughly equal time (5-10 minutes suggested), and in particular do not abbreviate interviews for projects that seem less competitive. Personal contact between student and judge is important both for an objective and complete evaluation of the student's knowledge of the project **and** the student's learning experience. This is an educational process as well as a competition. **Judges shall put a sticker dot (provided by CSEF) on the Student's Interview record at the project for each student they interview.**

- 5) Using the CSEF Judging Criteria as a basis, establish a rating criterion for awarding points to the exhibits. Some judges arbitrarily award about 50% of the rating points on each criteria to the first exhibit they examine. They then rate all following exhibits by adding or subtracting points from the ratings on the basis of comparison with the first exhibit. This procedure or any other procedure which will establish the relative merits of exhibits is acceptable. The Rating Cards and method of rating are the personal and confidential information of each individual judge.

The **JUDGE'S COMMENT CARD - STUDENT'S COPY** may be used to pass on constructive comments to the students by returning them to the **Judging Coordinator**. Judges are encouraged to utilize the interviewing process to provide first hand feedback and interaction with each student.

- 6) As soon as individual judge's ratings are completed, exchange information within the team so that the order of merit of exhibits assigned to the team can be established. The **TEAM CAPTAIN** is responsible for setting the judging/discussion schedule with the team members to meet the **3:30 p.m. deadline** for the Selection of the Team Project nominee and **5:30 p.m. deadline** for completing the selection of Individual award winners for each category.

In the case where multiple sub-teams (**BLUE AND GOLD**) exist for a category, the **TEAM CAPTAIN & Assistant Captain** need to coordinate the team's procedure and schedule to facilitate selection of the category winners. **Assistant Captains are not required to come early or stay late.** As soon as the top three or four exhibits are selected by multiple sub-teams, the information should be exchanged with the other sub-team in the category so that further comparisons and interviews can be completed. The sub-teams should then meet together for the final award selection. From these actions, the **three** Individual winners of **First, Second, and Third Place, and Honorable Mention awards** for each Category shall be selected.

If additional interviews are required to facilitate team discussions, care shall be used to avoid making obvious which exhibits are being considered for the awards while students are in the exhibit area. The students will be only be available for interviews until 5:00 p.m..

- 7) Each Content Category judging team may select zero, one or two **TEAM PROJECT NOMINEES** for inclusion in the candidate pool for the First, Second and Third place and Honorable Mention Best Team Project awards for each Division. Nominee selection will be completed by **3:30 p.m.**
- 8) The **TEAM PROJECT JUDGING TEAM** will include only the Team Judging Representative from each Content Category that submits a nominee for the Team Project Awards. The Team Project Judging Team will meet with the Judging Coordinator for instructions at **3:30 p.m.** in the **CHEROKEE PARK ROOM**. The Team Project Judging Team will select the First, Second and Third Place and Honorable Mention Best Team Project awards for the Junior and Senior Division and Team Project Judging Team Captain will submit the results to the Judging Coordinator by **5:30 p.m.**
- 9) The Judging Coordinator will provide the AWARD RESULTS form to each Team Captain. **The Captain of each Category Team must sign the Award Results form** before turning it in. **Remember, NO TIES ARE ALLOWED for 1st, 2nd and 3rd place, and Honorable Mention Awards may be awarded only if 1st, 2nd and 3rd place awards are given.**

Each **TEAM CAPTAIN** will submit the Award Results Form to the **Judging Coordinator** in the **CHEROKEE PARK ROOM** of the Lory Student Center **by 5:30 p.m.**

The Captain or designated All Fair judging team representative for each category should assemble in the **CHEROKEE PARK ROOM** after submitting results. The **First place Individual Project** winners from all **TWELVE content categories** from each Division will then be submitted for the **ALL FAIR** judging which starts at **5:45 p.m.**

- 10) The **ALL FAIR** judging teams will determine the **1st, 2nd and 3rd Individual** best-of-fair projects for the Junior and Senior Division per the **ALL FAIR JUDGING INSTRUCTIONS**.

## **ALL FAIR AWARDS JUDGING INSTRUCTIONS**

- 1) In determining All Fair winners, only the **First Place Individual Project** category winners are eligible. All of the categories are to be given EQUAL consideration for the All Fair award.
- 2) Each **Category Team Captain or designated representative to the All Fair Judging Team MUST be prepared to discuss his/her Category's First Place award winner's project with the other All Fair judging team members**. Note that student's are allowed to remove expensive equipment at 5:00 p.m., so All Fair team members should be prepared to describe the impression the student's total exhibit had on the Category judging team.
- 3) Each **Category Team Captain/Representative** shall advise the other All Fair Judging Team members of the exhibit number of the First Place winner of each of their respective categories (Animal Sciences, Behavioral & Social Sciences, Chemistry, Earth & Space Sciences, Energy & Transportation, Engineering, Environmental Sciences, Mathematics & Computer Sciences, Medicine & Health, Microbiology, Physics, and Plant Sciences).
- 4) The All Fair judging teams shall then examine the exhibits as a group in the exhibit area. Students should be out of the exhibit area after 5:00 p.m., if they are not please notify one of the State Fair officials so that we may assure the students' departure from the exhibit area. **Each of the Category Team Captains/Representatives will then make presentations describing the First place exhibit from their respective category and answer questions from the other judges.**
- 5) The selection of the All Fair winners shall be completed by **8:30 p.m.** The All Fair winners shall be recorded on a Winner's List form and this plus the Category's Winner's lists shall be turned in by the All Fair Team Captains to the Judging Coordinator.

**THE CAPTAIN OF EACH ALL FAIR JUDGING TEAM IS REQUIRED TO SIGN THE AWARDS SHEET BEFORE SUBMITTAL TO THE JUDGING COORDINATOR.**

## **AWARDS CEREMONY AND SECRECY**

No judge shall disclose the name of any winner to anyone except persons authorized to receive such information. This restriction is made so that the winners' names will not be known until announced at the Awards Ceremony. The Awards Ceremony will be held Friday evening of the CSEF.