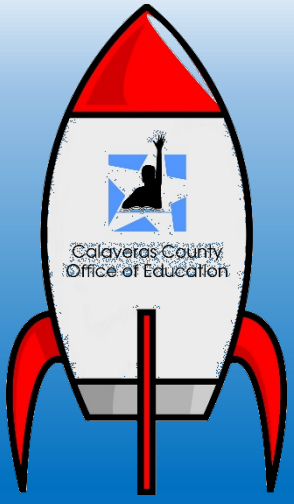
Calaveras County Office of Education Science Fair Handbook

35TH ANNUAL CALAVERAS COUNTY SCIENCE FAIR



March 7, 2020

Calaveras River Academy/Mountain Oaks Gymnasium
150 Old Oak Road, San Andreas

www.ccoe.k12.ca.us

Calaveras County Office of Education Science Fair Handbook

The Calaveras County Science Fair provides opportunities for all students in grades 4-12 to explore scientific inquiry and creatively exhibit science projects.

RULES AND REGULATIONS

A. Scientific fraud and misconduct are not condoned at any level of research or competition. This includes plagiarism, forgery, use of presentation of other researcher's work as one's own and the fabrication of data. Fraudulent projects will not be tolerated and will be disqualified.

B. Neither live animals nor preserved animals nor animal parts may be displayed. Regulations for research involving human subjects, tissue sample sources (including DNA source materials), and human treatment of live vertebrate animals, can be found by following this link: http://cssf.usc.edu//Info_Genl/Research_Regs.html

C. Anything that might be harmful to people or property is prohibited from the Fair. This includes, but is not limited to, acids, unsecured glassware, mercury (including glass thermometers), hazardous microbes, carcinogenic and radioactive materials, open flames, and unsealed foodstuffs which may attract pests. For these items, the substitution of illustrations or photographs is encouraged.

D. No gas or running water will be available for science fair projects. Electrical power will be available upon request.

E. Do not display valuable items. We assume no responsibility for loss or damage to any project or its parts.

PROJECT REQUIREMENTS

A. **COMPETITIVE PROJECTS:** A project may be the work of one student (individual) or a maximum of three students (group). Individual and group projects at each grade level will be judged together in one category. Competitive projects use the scientific method and are eligible to advance to the California State Science Fair.

B. **NON-COMPETITIVE PROJECTS:** A project may be the work of one or more students. School science clubs are encouraged to participate. Demonstrations, displays, research and inventions will be allowed but will not be judged competitively. These projects will be placed in a separate section and will be judged by popular vote.

C. Display size regulations:
Maximum width: 4 feet (122 cm)
Maximum depth: 2.5 feet (76 cm)
Maximum height: 6.5 feet (198 cm) (table) / 9 feet (274 cm) (floor)

Projects displayed on tables are the preferred standard. Projects which require floor access may utilize Science Fair tables for a portion of their display, but the entire display must still fit within the width and depth limitations above.

D. Student name(s) should not be written on the project. The completed online student entry form will be placed on the back of the project during Friday registration.

E. Abstracts must demonstrate a level of knowledge and investigation that is appropriate for the grade of the student and discipline, and which is beyond what is considered common knowledge.

F. The abstract is a summary of the entire project that includes the following details.
- Objective or Goal.
- Materials and Methods: Summarize the materials and methods.
- Results: Summarize the results of your experiment and indicate how they pertain to your objective.
- Conclusion/Discussion: Indicate if your results supported your hypothesis or enabled you to attain your objective. Discuss briefly how information from this project expands our knowledge about the category subject.

G. The student's original laboratory notebook must be present for inspection during judging.
- One per student participant.
- MUST be an ongoing dated log of everything. Should be an authentic representation of entire project. Should show evidence of student thinking, brainstorming ideas, processing and reflection of what occurred.
- Must be detailed and identify variables and controls as applicable. In the writing be sure to include MULTIPLE TRIALS!
- A detailed list of ALL materials should also be contained in the journal. It is recommended that in grades 6-12, all measurements should be in metric form.
- Analysis of data or of procedure. This should be in-depth, not just one or two sentences.

H. Students must be present at their display during the judging period or the project will not be judged. For team projects, a minimum of one-half of the participants must be present before judging will be allowed.

I. Participants must submit their Student Entry Form online with a parent.

J. A maximum of ten projects may be entered per small school (fewer than 300 students) or 15 projects per large school. The school may decide the number per grade level where appropriate.

PROJECT TYPES

COMPETITIVE PROJECTS

"EXPERIMENT"

- Hypothesis
- Collect data
- List of materials
- Log book
- Multiple trials of the experiment
- Findings
- Conclusion(s), or what was learned

NON-COMPETITIVE PROJECT

"DISPLAY/RESEARCH"

- Space travel (example)
- Research
- Reading
- Create a display board, DVD, or PowerPoint presentation with information on it. A display of what was learned through research

"DEMONSTRATION"

- Involves something physical you can touch
- Scientific principle being demonstrated
- Building a model or working model of something that already exists to demonstrate a scientific fact
- Example: Building an underwater robot

"INVENTION"

- Create something new to demonstrate a scientific principle

NOTE: **California State Competition only accepts EXPERIMENTS**, therefore CCOE groups the DISPLAY/RESEARCH, DEMONSTRATION, and INVENTION projects separately from EXPERIMENTS.

PROJECT CATEGORIES

Life Science

Biochemistry/Molecular Biology: Studies at the molecular, biochemical, or enzymatic levels in animals (including humans,) plants, and microorganisms, including yeast. Studies of biological molecules, *e.g.*, DNA, RNA, proteins, fats, vitamins, nutrients.
Mammalian Biology: Studies of growth and developmental biology, anatomy, and physiology in all mammals, including humans. Studies of the behavior of all mammals in their natural habitats (or reproductions of them.)
Microbiology (General): Studies of genetics, growth, and physiology of bacteria, fungi, protists, algae, or viruses. Includes surveys of bacterial contamination.
Microbiology (Medical): Studies of prevention, diagnosis, and treatment of infectious diseases caused by pathogenic bacteria, fungi, or viruses. Includes all antimicrobial studies except testing of commercial antimicrobials.
Plant Biology: Studies of the genetics, growth, morphology, or physiology of plants. Studies of the effects of fertilizers on plants.
Product Science (Biological): Comparison and testing of commercial off-the-shelf products for quality and/or effectiveness for intended use in real-world consumer-oriented applications. This category is reserved for experimental methods involving biological sciences and processes.
Toxicology: Studies of the effects of chemicals, toxins, medicinal and nutritional factors, prescription drugs, natural remedies, food components (caffeine), and other potentially harmful factors (such as temperature, carbon dioxide, radiation) at the cellular or higher levels on plants and animals.
Zoology: Studies of growth and developmental biology, anatomy, and physiology in animals other than mammals. Studies of the behavior of all animals (excluding mammals) in their natural habitats (or reproductions of them.)

Behavioral & Cognitive Science

Behavioral & Social Sciences: Studies of human psychology, behavior, development, linguistics, and the effects of chemical or physical stress on these processes. Experimental or observational studies of attitudes, behaviors, or values of a society or groups within a society, and of the influences of society on group behavior. Includes gender and diversity studies, anthropology, archaeology, and sociology. Studies may focus on either normal or abnormal behavior.

Cognitive Science: Studies of learning, memory, and cognition in humans, using human or animal models for human processes. Studies of the effects of chemical or physical stress on cognition. Includes projects on subliminal perception, optical illusions, recall and observations (*e.g.* reliability of eyewitnesses,) and the interaction of different senses.

Physical Science & Engineering

Aerodynamics/ Hydrodynamics: Studies of aerodynamics and propulsion of air, land, water, and space vehicles; aero/hydrodynamics of structures and natural objects. Studies of the basic physics of fluid flow.

Alternative Energy: Studies of power generation using alternative energy technologies such as solar cells.

Applied Mechanics & Structures: Studies concerning the design, manufacture, and operation of mechanisms, including characteristics of materials, dynamic response, and active/passive control. Testing for strength and stiffness of materials used to provide structural capability; studies and testing of structural configurations designed to provide improved weight and force loading or stiffness capabilities.

Chemistry: Studies in which chemical properties of nonbiological organic and inorganic materials (excluding biochemistry) are observed. Some studies involving physical properties are appropriate, including phase changes, crystal structures and formation, intermolecular and intramolecular forces.

Earth & Atmospheric Sciences: Studies in geology, seismology, physical oceanography, marine geology, coastal processes, atmospheric physics and chemistry, meteorology, and climatology including measurements, models, and the effects of climate change.

Electronics & Electromagnetics: Experimental or theoretical studies with electrical circuits, computer design, electro-optics, electromagnetic applications, and antennas.

Environmental Engineering: Projects which apply technologies such as recycling, reclamation, restoration, composting, and bioremediation which could benefit the environment, and/or the effects of pollution on the environment.

Environmental Science: Projects surveying, measuring, or studying the impact of natural and man-made changes on the environment. Examples include: floods, fires, biohazardous spills, acid rain, earthquakes, air pollution, and water pollution.

Math & Computer Science

Mathematics & Software: Studies in geometry, topology, real and complex analysis, number theory, algorithm analysis and optimization, artificial intelligence, computability, computer graphics, modeling and simulation, programming environments and languages.

JUDGING CRITERIA

Originality
Original ideas and the creative use of resources are usually impressive. This originality may be in the scientific concept, a new approach to solve an old problem, or a new interpretation of data. However, an original project must be well executed. Original projects are those that go beyond the textbooks and explore new ground and innovative techniques.

Comprehension
Comprehension is the understanding and appropriate use of scientific theory, terms, techniques, and methodologies. Students should have a depth of knowledge about the scientific and engineering principles and practices, which can be shown by the ability to extrapolate what was learned from the project to the subject in general. Depth includes understanding the basic science behind the project topic, comprehension at a finer level of detail, and awareness of the influence that the project has on related material in the subject topic.

Organization and Completeness
The project should have a well-defined goal or objective. The materials, methods, and experimental design should be sufficient to answer all the appropriate questions. A second component of organization is thoroughness, which includes not only the issue of how well the original questions have been addressed, but also the issue of how fully questions arising during the project have been addressed. It is the duty of all scientists to provide evidence in support of their claims. The burden of proof does not rest with the observer. Without supporting results or data, the science project is not a completed work.

Effort and Motivation
The amount of time a student has spent doing the actual science project and the amount of time the student has spent reading and learning the subject should both be considered. While motivation and effort are not the same, the amount of effort that goes into a project is usually an indication of a student's motivation. It is important to know if a student enjoyed the experience and is interested in learning more.

Clarity
Written and oral communication skills are very important in science and engineering. Ideas should be clearly presented and easy to understand. The experiments should have well-defined goals which indicate clear understanding of the basic science. A well-written abstract, easy to follow visual aids, and clear and concise answers all add to the quality of a project.

JUDGING FORM

TITLE OF PROJECT _____

GRADE LEVEL_____ **PROJECT NUMBER** _____

JUDGE'S NAME _____

	points possible	points scored
1. SCIENTIFIC METHOD (50)		
a. Question: Is it specific and well-phrased?	0-5	_____
b. Hypothesis: Is it reasonable and worthy of research?	0-5	_____
c. Research: Was it researched? Multiple sources? Bibliography?	0-10	_____
d. Experiment: Is there a lab notebook? Are the results measured? Is there a control? A variable? Multiple trials? List of materials?	0-10	_____
e. Results and Analysis: Results indicate a conclusion? Results graphed? Is there statistical analysis? Did new questions arise? Conclusions supported by data?	0-10	_____
f. Write-up: Legible? Clear? Clean? Bound?	0-10	_____
2. ORIGINALITY (10)		
Original ideas and creative use of resources?	0-10	_____
3. ORGANIZATION AND COMPLETENESS (10)		
Is the idea developed? Knowledge of topic displayed?	0-10	_____
4. EFFORT AND MOTIVATION (10)		
Did the student spend time on the project? Does it attract your attention and reward you for your time?	0-10	_____
5. CLARITY (10)		
Are the ideas clearly presented and easy to understand? Is the workmanship good?	0-10	_____
6. ORAL INTERVIEW/ COMPREHENSION (10)	0-10	_____
TOTAL	**100**	_____

AWARDS

A. A plaque will be awarded to the overall best project in each of the four competitive categories: Life Science, Behavior & Cognitive Science, Physical Science & Engineering, and Math & Computer Science.

B. Competitive projects will be judged against a set of criteria and awarded a first, second, third place, or honorable mention ribbon.

C. The grand prize winner will receive a prize and an engraved rotating trophy that will be placed at their school for that year.

D. The winner of the best demonstration, invention or display will be judged by popular vote and awarded a trophy.

IMPORTANT DATES AND DEADLINES

(Click on links to get to online forms)

February 7, 2020	Intent to Participate online form due (Teachers/ Administrators submit)
February 21, 2020	List of Participating Students online form due (Teachers/ Administrators submit)
February 28, 2020	Student Entry online form due (Students & Parents submit)
March 6, 2020	**Day before the Science Fair** Project drop off at Calaveras River Academy/ Mountain Oaks Gymnasium- 150 Old Oak Rd., San Andreas All projects must be set up from 2:00 -6:00 p.m. the day before. **No projects will be accepted on Saturday morning.** *Students will be given an interview time when they drop off their project.

March 7, 2020	**Day of Science Fair** **9:00 a.m.** Doors open and student check-in begins **9:00 - 9:45 a.m.** Public viewing- students are encouraged to come at this time to practice presenting their project. **9:45 a.m. - 12:45 p.m.** Project judging- students will be called up when judges are ready. While judging is taking place, non-competitive projects will be voted on by the public. **12:45 - 3:00 p.m.** Lunch and final judging (Gym will be closed during this time) **3:00 - 3:30 p.m.** Awards Ceremony

ADDITIONAL INFORMATION

We recommend that your students bring a snack, some homework or a book to read while waiting for their interview time. Students are encouraged to dress professionally if possible.

Projects should be dismantled and removed from the Calaveras River Academy/ Mt. Oaks Gymnasium Saturday, March 9, 2019 following the awards ceremony. Any projects left in the Gymnasium will be taken to the Calaveras County Office of Education in Angels Camp. They will be held until March 16 at which time they will be discarded.

For more details visit www.ccoe.k12.ca.us/sciencefair
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