RIMS
INLAND SCIENCE AND ENGINEERING FAIR

SPONSORED BY:
RIVERSIDE COUNTY OFFICE OF EDUCATION
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Riverside County Superintendent of Schools

INYO COUNTY OFFICE OF EDUCATION
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Inyo County Superintendent of Schools

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Mono County Superintendent of Schools

SAN BERNARDINO COUNTY
SUPERINTENDENT OF SCHOOLS
Gary S. Thomas, Ed.D.
County Superintendent

REGULATIONS AND INFORMATION PACKET 2013-2014

National Orange Show Events Center
Damus Building
689 South E Street
San Bernardino, CA
April 1-2, 2014

Student Online Registration: February 11-27, 2014

District/School Registration Deadline: March 12, 2014

RIMS INLAND SCIENCE AND ENGINEERING FAIR

Suggested District Time Line for Teachers/Coordinators

Months of SEPTEMBER & OCTOBER:	Schedule date of your school science fair (prior to February 11th if possible)
	Reserve space for your school's science fair.
	District representatives is encouraged to attend Coordinator's Fall Orientation Meeting
	Science Fair Expo open to all students and parents
Month of NOVEMBER:	District representatives provide workshops for teachers.
	Orient students to the components of a science fair project.
	Assist students in choosing a suitable topic.
Month of DECEMBER:	Help students write a project proposal.
	Help students conduct library research.
Month of JANUARY:	District representatives are encouraged to attend January Coordinators' Meeting.
	Help students contact professionals who can give them guidance and background.
	Help students develop a list of materials they need for projects.
	Discuss the nature of experimentation with students.
	Explain the difference between controlled and uncontrolled experiments.
	Review observing, measuring and data collection.
	Provide time, space, and guidance for experimentation.
	Make arrangements for regular (weekly) progress reports from students.
	Check to insure that projects conform to safety rules and proper animal care.
	Review exhibit construction with students.
	Review qualities of a good exhibit (construction, lettering, color, etc.).
	Conduct a "Parents' Night" to publicize Science Fair.
Month of FEBRUARY:	Help students develop conclusions and write research papers.
	Arrange for review of students' papers by language arts teachers.
	Publicize your fair to local newspapers, parents, local officials, board of education administrators, and faculty.
	Recruit Science Fair Judges.
	Students develop final copies of research paper.
	Review with students the criteria for successful oral presentations; let them practice in class.
	District Science Fair Day

Inland Science and Engineering Fair 2014 Time Line

On-Line Registration

February 11-February 27 2014
Students or coordinators may register entries online anytime during these dates. Late registrations will not be accepted.

Science Fair Registrations

March 12, 2014 (submitted from District/School Coordinators)
District/School Submittal Form, online applications with abstract (1 per student), payment, and summary sheet of students. No faxes please. Send to SBCSS, Attn: Dottie Bryant, 601 North E Street, San Bernardino, CA 92415

Elementary Project Setup

Tues., April 1, 7:00 am-9:00 am (Elementary students do not remain for interviews).
Students set up displays at the Damus Building, National Orange Show. Students must participate under "Field Trip" requirements and provisions.

***Junior/Senior Project Set-up**

Tues., April 1, 7:00 am-8:30 am *
Juniors/Seniors set up displays in the morning and remain for orientation and interviews. Junior/Senior orientation begins at 8:30 a.m., interviews at 9:00 a.m. A FREE Snack is provided for students during break. Lunch is not provided, and junior/senior students are dismissed at 1:30 p.m.

Sweepstakes

Tues., April 1, 2:30 pm-6:00 pm **Sweepstakes Judging**

Public Viewing

Tues., April 1, 6:00 pm-7:00 pm **Damus Building**
Wed., April 2, 9:00 pm-7:30 pm **Damus Building**
The Fair is open to visitation by individuals and groups. No fee is charged, but groups must reserve a time for visitation by calling (951) 826-6570. Supervision is required (no more than 8 students for each adult). Groups must be covered for insurance purposes by school or organization "Field Trip" forms.

Awards

Inyo/Mono/San Bernardino Counties-Wed., April 2, Renaissance Room
6:00 pm: Elementary, Junior, & Senior Division Awards (Grades 4-12)
7:30 pm: Meeting for State Science Fair nominees (following awards program)
Riverside County-Wed., April 2, Riverside Municipal Auditorium
6:00 pm: Elementary, Junior, & Senior Division Awards (Grades 4-12)
7:30 pm: Meeting for State Science Fair nominees (following awards program)

Project Removal

Tues., April 1, 6:00 pm-7:00 pm **Damus Building (Optional)**
Wed., April 2, 9:00 am-7:30 pm **Damus Building**
Displays must be removed by students before or immediately after the awards ceremony. Projects not removed will be discarded.

State Science Fair

April ~~14-15~~ 28-29, 2014 Tentative **California Science Center, Los Angeles**
California Science Center, Los Angeles
(Grades 6-12th Only)
Monday, 2:00-5:00 pm - Student set-up of displays.
Tuesday, 8:00 am - Judging begins.

*** NOTE: All Juniors/Seniors Interviews will begin at 9:00 a.m.**

INLAND SCIENCE AND ENGINEERING FAIR

GENERAL REGULATIONS

1. Display size limitations:

Maximum width:	4 feet	(122 cm)	
Maximum depth:	2.5 feet	(76 cm)	
Maximum height:	6 1/2 feet	(198 cm)	table
	9 feet	(274 cm)	floor

   - All projects must fit within these prescribed space limitations. This include elements of the project that may extend or protrude. Displays which are admitted, but are later augmented to exceed the space limitations will be disqualified until brought into conformance. Using the aisle betweeen projects as additional display space, even temporarily during interviews, is cause for disqualification.

2. Open flames will not be permitted in the display. No gas, water, or extension cords will be provided.

3. A student may participate in only one project. Teams are limited to 2-3 students within their division. No limit is placed on the number of team projects per district, but each team project uses one of your district's allocations. Projects may only be grouped as follows: 4th and/or 5th, 6-8, or 9-12. A project completed by both 4th and 5th grade students will be judged as a 5th grade project. Students must be emrolled from the same district.

4. The Science Fair Committee reserves the right of refusal of an exhibit that it deems unsafe, unsuitable for public exhibition, or in direct conflict with California Education Code. This includes, but is not limited to, any projects that display or discuss subjects that require parental consent and/or rights of review.

5. All projects must be pre-approved by the student's teacher and begun at any time during the year preceding the pre-registration date. A previously investigated topic may continue under investigation, but data previously displayed must be treated as "research." New data must be generated, displayed, and conclusions drawn based on this data.

6. Displays entered in the Inland Science and Engineering Fair must have been selected at a local school science fair or selection process.

7. The Science Fair Committee and all cooperating groups will assume no responsibility for loss or damage to any exhibit or part thereof. Students assume responsibility for all displayed equipment. It is recommended that valuable components including original notebooks or data <u>not</u> be left on public display.

8. All regulations conform to the recommendations of the California Education Code. Their enforcement is required for all projects and participants.

TOBACCO, ALCOHOL, AND CONTROLLED SUBSTANCES

1. No project may use consumable alcohol, tobacco or <u>illegally</u> obtained narcotics and/or controlled substances. This includes surveys that compare use of the above substances; (e.g. smokers vs. non-smokers).

2. Controlled Substances (drugs, chemicals, anesthetics, etc., the use of which is regulated by the Comprehensive Drug Abuse Prevention and Control Act of 1970) must conform to existing local, state, and federal laws. Such substances may not be exhibited at the Fair.

INLAND SCIENCE AND ENGINEERING FAIR SAFETY RULES

1. Electrical Materials:
   * Electrical materials must meet standard safety laws and practices.
   * No exposed electrical hazards.
   * Only UL approved grounded power codes and/ or surge protectors are allowed. (Cords are NOT provided).
   * Batteries with open top cells (wet cell batteries) are not permitted.

2. Lasers and Rays:
   * Any device (vacuum tubes, lasers, etc.) that generates dangerous rays must be properly shielded.
   * Only Class I and II lasers are allowed to be operated at the fair and must be designed to prevent human access to the beam during operation.
     - The laser will be operated only by the exhibitor and will be disconnected when not being operated.
     - The display will bear the sign: LASER RADIATION - DO NOT STARE INTO THE BEAM.

3. Biofuels:
   * Research involving biofuel/alcohol production must conform to the U.S. Dept of Treasury, Alcohol and Tobacco Trade Bureau regulations. Permits must be acquired prior to the production of any alcohol in the project. For permits, application and regulations, visit the website. http://www.ttb.gov/forms/F511074.pdf or call 888/882-3277 or 513/684-7150 for more info.

4. Chemicals:
   * Only chemicals listed in Apprendix C, page 138-139 of the "Science Safety Handbook for California Public Schools' (current edition) may be used under the direct supervision of a qualified teacher/adviser.

4. Chemicals: (cont)
   * No projects that use a chemical with a hazard rating of five or with asterisks will be allowed to participate in the fair.

5. Projectiles:
   * Projects that do not comply with current California Code Sections (Penal and Health and Safety) will **NOT** be allowed in the fair. Examples include but are not limited to:
     - Sealed devices containing dry ice or other chemically reactive substances designed to produce an explosion by a chemical reaction.
     - Rocket-propelled projectile or similar device with an engine greater than 0.60 inch in diameter.
   * Projects involving the discharge of a single or multiple projectiles through mechanical, chemical or electromagnetic means may Not be displayed at the fair. Examples include but are not limtied to:
     - Archery, tackle, airguns, firearms of any type, electromagnetic railguns, etc.

6. Fire regulations prohibit the use of highly flammable or combustible materials in project displays.

7. Glass/liquid of any type is not permitted at the fair (due to safety/spill hazards).

8. Living Organism:
   * Displays may not contain any living organism. The prohibition includes all animals, plants and studied collections of microscopic life forms such as bacteria, fungi, and molds. The display of preserved animals is not permitted. Projects may not display photographs of procedures detrimental to the health and well being of vertebrate animals.

ALL DISPLAYS WILL BE INSPECTED FOR COMPLIANCE: Project Displays not complying with the RIMS Inland Science and Engineering Fair Regulations and Safety Rules will be disqualified and not displayed.

IMPORTANT: LOSS OR DAMAGE - Valuable equipment, such as computers may be part of the display only if the student participant accepts full responsibility. It is advised that valuable materials (e.g. computers, research notebook) be on display only during the actual judging period. The RIMS Inland Science and Engineering Fair assumes no responsibility for loss or damage to any project or project part.

HUMAN SUBJECTS AND LIVE VERTEBRATE ANIMALS

1. If applicable, Certification of Humane Treatment of Live Vertebrate Animals or Certification of Compliance of Research Involving Human Subjects or Certificate of Tissue Samples must be submitted with your application to your district coordinator. Personal and school identification, including photographs, must be concealed.

2. Human parts other than teeth, hair, nails, histological sections, and liquid tissue slides (properly fixed and acquired) may not be exhibited.

3. Photographs or other visual presentations of surgical techniques, dissections, autopsies, and/or laboratory techniques depicting vertebrate animals in other than normal conditions may not be displayed.

4. Live vertebrate animals may **not** be displayed during the Fair. (Students conducting projects involving live vertebrate animals must provide a completed Certificate of Humane Treatment of Live Vertebrate Animals, see page 22.)

5. State of California Education Code Title 2, Division 2, Part 28, Chapter 4, Article 5 (51540): In the public elementary and high schools or in public elementary and high school sponsored activities and classes held elsewhere than on school premises, live vertebrate animals shall not, as part of a scientific experiment or any purpose whatsoever:
   a. Be experimentally medicated or drugged in a manner to cause painful reactions or induce painful or lethal pathological conditions.
   b. Be subjected to surgery or sacrifice, including embryos.
   c. Be injured through any other treatments including, but not limited to, anesthetization or electrical shock. Live animals on the premises of a public elementary or high school shall be housed and cared for in a humane and safe manner. The provisions of this section are not intended to prohibit or constrain vocational instruction in the normal practices of animal husbandry.

Projects That Required Certification By A Biomedical Scientist:

1. All recombinant DNA research must be carried out in accordance with current NIH Guidelines for Research Involving Recombinant DNA Molecules. Only research normally conducted without containment in a microbiological laboratory and performed under the supervision of an appropriately qualified scientist will be permitted. The facilities to be used must be described in the research plan. Research requiring containment is prohibited.
2. It is permissible for the student and designated adult supervisor to consult with a biomedical scientist to obtain detailed instructions and guidance in techniques to be used by the student under the direct continuous supervision of a designated adult supervisor (for research not conducted in the biomedical scientist's lab). In this instance the designated adult supervisor will be required to certify in writing jointly with the biomedical scientists.
3. Either the biomedical scientist or adult supervisor must provide continuing supervision to assure compliance with the protocol (see page 27).
4. Major deviations from the approved protocol may be implemented only with the written approval of the biomedical scientist, but may never violate California Education Code.
5. The biomedical scientist or adult supervisor must be in the same locality as the student for the duration of the experimental work except for short trips. This means that a project started in one city may not be continued in another unless an alternate designated adult supervisor, approved by the biomedical scientist prior to the continuation of the experimental work, agrees to supervise the project.
6. A biomedical scientist is defined as one who possesses an earned doctoral degree in science or

Inland Science and Engineering Fair Categories

Elementary Division (4-5)

(Separate awards are given for each grade level, except for team projects which are judged at the highest grade level represented in the project.) Team projects, which are produced collaboratively with two to three students in any of the eight areas of science listed below, are judged along with the individual projects in the same category.

1. **Behavior Science - (01)**
   Studies of behavior, conditioned responses, learning, psychiatry or psychology in humans and other animals.

2. **Biology Animals - (02)**
   Studies of vertebrate or invertebrate zoology.

3. **Biology/Other Kingdoms - (03)**
   Studies of plants, fungi, protists and bacteria.

4. **Chemistry - (04)**
   Studies of the chemical and physical properties of organic and inorganic materials.

5. **Consumer Science - (05)**
   Examination, comparison, analysis, testing of manufactured devices or trade name chemicals, materials, etc. Product quality, safety and consumer satisfaction.

6. **Earth Sciences - (06)**
   Studies of geology, meteorology, oceanography, astronomy and space science.

7. **Environmental Education - (07)**
   Projects using biological systems/organisms to study the impact of natural and man-made changes on our environment.

8. **Engineering - (08)**
   Projects that follow the Engineering Design Process to develop solutions by building and testing prototypes of new or improved devices.

9. **Math - (09)**
   Studies in geometry, topology, number theory, statistics, computer graphics, artificial intelligence, and modeling or simulations.

10. **Physics - (10)**
    Studies of electricity, magnatism, aerodynamics, energy, physical properties of matter and applied mechanics.

Junior & Senior Division (6-12)

Students in Junior Division (grades 6-8) and Senior Division (grades 9-12) may compete in the following categories:

Category	Examples	Related Categories
1. **Aerodynamics/ Hydrodynamics (Junior Division Only):** 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.	Effect of Dimples on Golf Ball Flight; Airfoil Stall Characteristics; Effect of Fins on Water Rocket Stability; Low Drag Launch Lug for Model Rockets.	Ballistics studies comparing other than different shapes or surface textures belong in Materials Science or Applied Mechanics. Senior Division projects otherwise appropriate for this category belong in Applied Mechanics.
2. **Alternative Energy (Junior Division Only):** Studies of power generation using alternative energy technologies such as solar cells.	Analysis of Nanocrystal Dye-sensitized Solar Cells; Maximizing the Power Output of a Crystalline Silicon Photovoltaic Module through the Use of Solar Concentrators.	Aerodynamic studies on turbines belong in Aerodynamics/ Hydrodynamics. Hydroelectric projects generally belong in Electronics & Electromagnetics. Senior Division projects otherwise appropriate for this category belong in the relevant basic science (e.g., Physics & Astronomy, Electronics & Electromagnetics, Chemistry).
3. **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. Senior Division only: includes aerodynamics, hydrodynamics, and fluids projects.	An Underwater Glider for Marine Exploration; Measurement of CD Variations; Tensile Strength of Composite Materials; Bridge Design; Can Foam Make Steel Stronger?; How Does Arch Curvature Affect Strength? How Do Different Foundations Stand Up to Earthquakes? Sr. Div: "Arrow" Dynamics; Measuring the Effect of Aerodynamic Design on Vehicular Drag.	Junior Division aerodynamics/ hydrodynamics projects belong in Aerodynamics/ Hydrodynamics. Engineering studies of soil stability during earthquakes belong in Earth & Planetary Sciences.
4. **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. Senior Division only: includes studies of cognition.	A Study of the Senses in Stress Management; Racial Awareness in Infants; AIDS Awareness in Teens; The Effect of Authority Figures on Group Decision Making.	Animal behavior projects belong in Zoology or Mammalian Biology. Junior Division projects studying memory, learning, and sensory perception belong in Cognitive Science.

Junior & Senior Division (6-12)

Students in Junior Division (grades 6-8) and Senior Division (grades 9-12) may compete in the following categories:

Category	Examples	Related Categories
5. **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.	Lipooxygenase Influence on Lipofuscin Granule Formation in Bananas; Effects of P1 Precursors on Virus Growth; Isolation of Pre-mRNA Mutants in Saccharomyces cerevisiae; Determination of Ascorbic Acid Concentration in Orange Juice Using a Redox Reaction; Effects of Food Preparation on Vitamins.	Studies of the physical properties of biochemicals such as oxidation-reduction reactions belong in Chemistry. Functions of major organ systems belong in Mammalian Biology or Zoology.
6. **Chemistry:** Studies in which chemical properties of nonbiological organic and inorganic materials (excluding biochemistry) are observed.	Isolation, Purification, and Specific Rotation Determination of Ricinoleic Acid; Conductivity of Electrolytes; Does Water Purity Affect Surface Tension?	Chemical studies of metabolic processes (e.g. fermentation and/or yeast), processes mediated by biochemical intermediates (e.g. enzymes), or biological organic molecules belong in Biochemistry. In the Junior Division, projects that deal with the characterization of chemical products in everyday life belong in Materials Science or Product Science (Physical).
7. **Cognitive Science (Junior Division Only):** 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.	Does Age Affect Implicit Learning?; The Effectiveness of Flash Cards vs. Computer Scripts; Optical Illusions; Subliminal Persuasion by Television; Eyewitness Identifications; Effect of Curcumin on Memory.	Studies examining basic human senses and physiological, rather than psychological, reactions belong in Mammalian Biology. Senior Division projects otherwise appropriate for this category belong in Behavioral and Social Sciences.
8. **Earth & Planetary Sciences:** Studies in geology, seismology, engineering geology, atmospheric physics, weather, physical oceanography, marine geology, and coastal processes.	Gravity Current Velocities; Beach Sand Fluctuations and Cliff Erosion; Dependence of Liquefaction upon Soil Composition; Influence of Site Effects on Peak Ground Acceleration in the Northridge and Whittier Narrows Earthquakes; Solar Activity and Refraction Properties of the Ionosphere.	Studies concerning pollution caused by human activity belong in Environmental Science. Earthquake engineering projects (other than soil stability) belong in Applied Mechanics & Structures.

Junior & Senior Division (6-12)

Students in Junior Division (grades 6-8) and Senior Division (grades 9-12) may compete in the following categories:

Category	Examples	Related Categories
9. **Electronics & Electromagnetics:** Experimental or theoretical studies with electrical circuits, computer design, electro-optics, electromagnetic applications, and antennas.	Satellite Reception Without a Dish; The Gauss Rifle; Transmission of Information by Laser; Are Maglev Trains Practical?	Projects that merely use electronics to study something else (e.g., hearing in birds) belong in another category (Zoology in this example).
10. **Environmental Engineering (Junior Division Only):** 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.	Newspapers as Mulch; Oil Control; Water Hyacinth: Primary Water Treatment?; What Soil Conditions Best Control Soil Erosion While Assisting Growth?; Designing a New Home Sewer System.	Senior Division projects otherwise appropriate for this category belong in Environmental Science.
11. **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.	The Effects of Fires on Flora and Fauna; How Does Water Quality Affect the Abundance and Diversity of Micro-invertebrates; Bacteria Pollution in Our Beaches; An Analysis of Dissolved Oxygen and Density in Ballona Creek.	Studies performed under unrealistic or simulated conditions to examine the effect of substances or conditions on living things belong Pharmacology/ Toxicology or the relevant basic science category (e.g., Plant Biology, Mammalian Biology, Zoology, etc.).
12. **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).	Effect of Age on Aerobic Abilities; Peripheral Vision; Correlation of Strength with Gender; Effect of Vaccination on Antibody Development in Neonatal Bovines; Lung Capacity, Age, and Exercise; Crossed Hand-Eye Dominance.	Projects studying physiology of birds, insects, etc. belong in Zoology. Studies of the effect of chemicals on a physiological function may belong in Pharmacology/ Toxicology. Studies in which animals serve as a model for human learning or behavior belong in Cognitive Science (Jr) or Behavioral & Social Sciences (Sr).
13. **Materials Science (Junior Division Only):** Studies of materials characteristics and their static (not in motion) physical properties. Includes measurements and comparisons of materials durability, flammability, and insulation properties (thermal, electrical, acoustic, optical, electromagnetic, etc.).	Which Metal Conducts the Most Heat? What Is the Effect of Duct Tape as an Insulation Material? Sun Protection on the Courts: A Test of Colors and Materials in Tennis Clothing; Which Building Material Disrupts a Wireless Connection the Least?	Studies of fundamental properties of matter (e.g., specific heat) belong in Physics & Astronomy. Studies comparing and testing natural and manmade products for effectiveness in intended use in real-world, consumer-oriented applications belong in Product Science (Physical).

Junior & Senior Division (6-12)

Students in Junior Division (grades 6-8) and Senior Division (grades 9-12) may compete in the following categories:

Category	Examples	Related Categories
14. **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.	Maximally Dispersed Points on a Sphere; Computer Modeled Evolution; Knot Mathematics; Coupled Chaotic Systems and Stability; Mathematical Optimization of Multiple Precision Multiplication; Partitions of Positive Numbers; Neural Network Model of Vision.	Projects using mathematics or computers as a tool in the study of a different subject belong in that category. Studies that merely model or simulate biological or physical systems usually belong in this category. Computer hardware projects (e.g., comparing algorithm speed on different hardware platforms) belong in Electronics & Electromagnetics.
15. **Microbiology (General):** Studies of genetics, growth, and physiology of bacteria, fungi, protists, algae, or viruses. Includes surveys of bacterial contamination. Senior Division Only: includes projects described within the category Microbiology (Medical).	Studies of Light Producing Bacteria; Enhancement of Algae Lipid Composition through the Manipulation of Temperature, Light, and Nutrient Levels; The Utilization of a Photobioreactor to Optimize the Growth Rate of Lipids in Microalga.	Projects studying photosynthesis or fermentation belong in Biochemistry. Projects using bacteria as a tool to study another subject belong in that subject.
16. **Microbiology (Medical) (Junior Division Only):** 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.	Effects of Spices on Escherichia coli growth on food; Antibiotic Resistance in Bacteria; Effects of Hand Washing on Absenteeism in Schools.	Projects using bacteria as a tool to study another subject belong in that subject. Testing of commercial antimicrobial products belongs in Product Science (Biological). Senior Division projects otherwise appropriate for this category belong in Microbiology (General).
17. **Pharmacology/ Toxicology:** Studies of the effects of chemicals, toxins, medicinal and nutritional factors (such as vitamins), prescription drugs, natural remedies, food components (caffeine), and potentially harmful factors (such as temperature, carbon dioxide, radiation) at the cellular or higher levels on plants and animals.	Vitamin Deficiencies; Effect of Caffeine on Daphnia. Effects of a Pyruvate Glucose Cocktail; Copper Toxicity of Marine Embryos; The Effects of Intermittent and Constant EMFs on Drosophila; The Effects of Petroleum Contaminated Water on Aquatic Plants.	Projects which study the effect of fertilizers on plant growth belong in Plant Biology. In the Junior Division, studies of the toxic effects of actual environmental changes on ecosystems belong in Environmental Science.

Junior & Senior Division (6-12)

Students in Junior Division (grades 6-8) and Senior Division (grades 9-12) may compete in the following categories:

Category	Examples	Related Categories
18. **Physics & Astronomy:** Studies of the physical properties of matter, light, acoustics, thermal properties, solar physics, astrophysics, orbital mechanics, observational astronomy, and astronomical surveys. Computer simulations of physical systems are appropriate in this category.	Emissivity as a Function of Geometry; Do High Temperature Superconductors have a First Order Phase Transition?; Chaotic Pendulum; Photometric Detection of an Extrasolar Planetary Transit; Jupiter's Decametric Emission; Solar Activity and Geosynchronous Satellites.	Electromagnetic propagation studies (e.g., antennas) belong in Electronics & Electromagnetics. Junior Division projects studying the characteristics of materials such as insulation properties belong in Materials Science. Projects concerning the study of soils/rocks from planetary objects belong in Earth & Planetary Sciences.
19. **Plant Biology:** Studies of the genetics, growth, morphology, or physiology of plants. Studies on the effects of fertilizers on plants.	The Effects of Organic and Inorganic Fertilizers on Plant Growth; Effect of Rhizobium on Legume Plants (Pisum); Transpiration of Plants Under Different Light Sources.	Studies using plants for indication or remediation of environmental pollution belong in the appropriate environmental category. Studies of the negative effects of chemicals on plants belong in Pharmacology/ Toxicology.
20. **Product Science (Biological) (Junior Division Only):** Comparison and testing of commercial off-the-shelf products (except antimicrobials) 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.	Preventing Pumpkin Decomposition; Antibacterial Soap vs. Antibacterial Gel: Cause for Concern? Tylenol Brand vs. Store Brand Acetominophen; Does Orange Oil Really Work?	Biological studies that do not include a commercial off-the-shelf product but are only testing potentially new consumer applications belong in their respective Life Science Category. Junior Division projects studying antimicrobial effectiveness belong in Microbiology (Medical). Senior Division projects otherwise appropriate for this category belong in the relevant basic science.
21. **Product Science (Physical) (Junior Division Only):** 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 non-biological, physical sciences and processes.	Water Absorption in Eight Selected Hardwoods With and Without Sealants; Best Plywood for Homemade Skateboards; Cotton, Linen, Wool: Which One Lasts Longer?; Fire Resistance of Roofing Materials; Which Laundry Detergent Works the Best? Shock Attenuation in Baseball Helmets.	Non-biological studies that do not include a commercial off-the-shelf product but are only testing potentially new consumer applications belong in their respective Physical Science category. Senior Division projects otherwise appropriate for this category belong in the relevant basic science.

Junior & Senior Division (6-12)

Students in Junior Division (grades 6-8) and Senior Division (grades 9-12) may compete in the following categories:

Category	Examples	Related Categories
22. **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).	Hot Fish, Cold Fish: Respiration in Goldfish; Hearing and the Dominance Hierarchy of Crickets; Effect of Gravity on Living Organisms; Invertebrates in Kelp Holdfasts; Auditory Stimuli in Interganglial Neurons of Acheta domesticus; Bird Responses to Boar Rootings.	Studies of mammals belong in Mammalian Biology. Studies in which animals serve as a model for human behavior belong in Behavioral & Social Sciences.

Parents:

In order for you student to complete a project dealing with Bacteria, Human Subjects, or Animals you will be required to abide by the following guidelines. In order to begin your project the Approval process must be completed then you will need to follow the specific guidelines for your project area as detailed below. Any failure to not abide by these guidelines will result in disqualification from the Science Fair due to health and safety concerns. It is our goal to keep your children safe during this fun and exciting process.

Thank you for understanding in this very important matter,
Your Science Teacher

Approval Process for Projects dealing with Bacteria; Human Subjects or Animals:

1. Student must present to the Science Fair Coordinator a completed Project proposal including:
    a. Title
    b. Question
    c. Purpose
    d. Hypothesis
    e. Procedure List
    f. Materials List
2. If Step one is approved the student will then receive a permission slip to be filled out by the student, their parent, and the specified supervisors for the area of the project. There may be a cost required for signatures and form completion.
3. Bring the completed form to the Science Fair Coordinator for your school site or the classroom Science Teacher for the final approval to begin the project.
4. If at any time there is a change made to the Procedure List, the approval process will need to be re-done to ensure all safety guidelines are being followed.

Bacteria Projects

- It is important to purchase your agar and petri dishes from a well-known science distributor as this will help ensure that the agar does not come already contaminated. Also pre-poured plates are the best.

Supplier	Contact Info
Science Kit & Boreal Laboratories	www.sciencekit.com 800-828-7777
Carolina Biological Supplies	www.carolina.com 800-334-5551
Bio-Rad Laboratories	www.bio-rad.com 800-424-6723
Sigma	www.sigma-aldrich.com 800-325-5832

- At least 3 dishes will need to be inoculated for each testing group and a control group will be required. Please make sure you order a couple extra for good measure.
- All Bacteria Projects must either be completed under the direct supervision of the classroom teacher at the school site, Science Fair Coordinator or certified lab technician. All other projects will be disqualified due to health and safety concerns.
- The incubation of the petri dishes must be done at school or a certified lab (A letter stating support will be required from the supervising lab.)
- Projects completed at school will only be able to start on Monday or Tuesday.
- This type of project can be expensive, in the range of $50-100.

Animal Projects

- Students will be required to check in with the classroom teacher or school site Science Fair Coordinator everyday that the project is ongoing to ensure safe conditions. If any stress or death occurs the project must be stopped due to possible inhumane animal conditions.
- Bring your journal noting the husbandry practices, to be signed off.

Human Subject Projects

- Permission Slips for participation in the experiment and the written survey will be required before the permission slip can be signed off by the classroom teacher or school site Science Fair Coordinator.

INLAND SCIENCE AND ENGINEERING FAIR
CERTIFICATION OF HUMANE TREATMENT OF LIVE VERTEBRATE ANIMALS

Name of Student _____

Project Title _____

Any student research involving animals MUST COMPLY with the requirements of the California Education Code stated below and Regulation #8, page 7 of the Safety Rules of the Inland Science and Engineering Fair.

HUMANE TREATMENT OF ANIMALS, State of California Education Code Title 2, Division 2, Part 28, Chapter 4, Article 5 (51540). In the public elementary and high schools or in public elementary and high school sponsored activities and classes held elsewhere than on school premises, live vertebrate animals shall not, as part of a scientific experiment or any purpose whatever:

(a) Be experimentally medicated or drugged in a manner to cause painful reactions or induce painful or lethal pathological conditions.

(b) Be injured through any other treatments, including, but not limited to, anesthetization or electric shock.

Live animals on the premises of a public elementary or high school shall be housed and cared for in a humane and safe manner. The provisions of this section are not intended to prohibit or constrain vocational instruction in the normal practice of animal husbandry.

"Experiments involving any procedures which are not in violation of the "painful reaction" or "injured" restrictions of the California Education Code and are not in violation of Inland Science and Engineering Fair rules are permitted if certified by a qualified biomedical scientist prior to the beginning of the investigation. It is permissible for the student and designated adult supervisor to consult with a biomedical scientist to obtain detailed instructions and guidance in the techniques to be used by the student under the direct continuous supervision of the designated adult supervisor (for research not conducted in the biomedical scientist's lab). In this instance the designated adult supervisor will be required to certify in writing jointly with the biomedical scientist. Either the biomedical scientist or adult supervisor must provide continuing supervision to assure compliance with the protocol. Major deviations from the approved protocol may be implemented only with the written approval of the biomedical scientist. The biomedical scientist or designated adult supervisor must be in the same locality as the student for the duration of the experimental work except for short trips. This means that a project started in one city may not be continued in another unless an alternate designated adult supervisor, approved by the biomedical scientist prior to the continuation of the experimental work, agrees to supervise the project. A biomedical scientist is defined as one who possesses an earned doctoral degree in science or medicine and who has current working knowledge of the techniques to be used in the research under consideration. A designated adult supervisor is defined as an individual who has been properly trained in the techniques and procedures to be used in the investigation. The biomedical scientist must certify that the designated adult supervisor has been so trained.

RESEARCH PLAN

Purpose of Project: _____

Starting Date: _____

Site at which investigation will take place:

Name _____

Address _____

Inland Science and Engineering Fair
Certification of Humane Treatment of Live Vertebrate Animals (continued)

Live vertebrate animals to be used:

a) Genus, species, and common name _____

b) Number of animals _____

c) Animals obtained from _____

List objectives of the experiment and describe fully the methods and techniques involved. When the use of electrical current, laser beams, sound stimuli or other artificial stimuli are an integral part of the Research Plan, they must not exceed the normal tissue tolerances for the species concerned (as indicated in the Biology Data Handbook, 2nd Edition; editors, P.O. Altman and S.S. Dittmer; publisher, Federation of American Societies for Experimental Biology).

_____

_____

_____

_____

Describe proposed methods of animal care:

a) Cage size _____

b) Number of animals per cage _____

c) Temperature range (maximum and minimum) degree Celsius of room where animals are to be kept _____

d) Frequency of feeding and watering _____

e) Frequency of cleaning cage _____

f) Type of bedding to be used _____

g) Where will animals be housed? _____

h) Where will animals be returned when research is complete? _____

_____

Name of animal care supervisor _____

Name of biomedical scientist _____

Name of designated adult supervisor _____

Signature of student _____

THE FIRST TWO CERTIFICATIONS MUST BE COMPLETED FOR ALL PROJECTS INVOLVING LIVE VERTEBRATE ANIMALS

CERTIFICATIONS

CERTIFICATION BY TEACHER/ADVISOR I agree to sponsor the student named above and assume responsibility for compliance with the existing rules and regulations pertaining to experiments with animals.

Signature

Name (type or print) _____ Date _____

Institution _____ Title _____

Institution Address _____ Phone _____

Home Address _____

Home Phone _____

CERTIFICATION BY ANIMAL CARE SUPERVISOR of compliance with California Education Code. (Must be completed prior to receipt of animals by the student.)

> **I certify that I have reviewed and approved the Research Plan and will supervise and accept primary responsibility for the quality of care and handling of the live vertebrate animals used by the designated student. I further certify that I am knowledgeable in the proper care and handling of experimental animals and meet prevailing animal supervisory requirements.**

Signature _____

Name (type or print) _____ Date _____

Institution _____ Title _____

Institution Address _____

Telephone Number _____

Home Address _____

Home Telephone Number _____

Source of My Authority/Expertise _____

Inland Science and Engineering Fair
Certification of Humane Treatment of Live Vertebrate Animals (continued)

NOTE: Complete this page if your project involves experimentation with live vertebrate animals or animal parts in a research or clinical facility where the use of anesthetics, drugs, or euthanasia becomes necessary.

CERTIFICATION BY BIOMEDICAL SCIENTIST (if required) of compliance with California Education Code and Rule #5 of the General Regulations for the RIMS Inland Science and Engineering Fair. (Must be completed prior to the start of the project.)

I certify that I have read the General Regulations for the Inland Science and Engineering Fair; that I have reviewed and approved the Research Plan; that if the student or designated adult supervisor is not trained in the necessary procedures, I will ensure his/her training; that I will assure that the requirements of the California Education Code are fully met; that I will provide advice and supervision personally or through a designated adult supervisor throughout the project; and that I am a qualified scientist with an earned doctoral degree (Ph.D., M.D., D.V.M.) and a working knowledge of the techniques to be used by the students in this research.

Signature _____

Name (type or print) _____ Date _____

Institution _____ Title _____

Institution Address _____

Telephone Number _____

Home Address _____

Home Telephone Number _____

Source of My Authority/Expertise _____

CERTIFICATION BY DESIGNATED ADULT SUPERVISOR (if required) I certify that I have been trained in the techniques to be used by this student; that I have read the General Regulations for the Inland Science and Engineering Fair; and that I will provide direct supervision for the research.

Signature _____

Name (type or print) _____ Date _____

Institution _____ Title _____

Institution Address _____

Telephone Number _____

Home Address _____

Home Telephone Number _____

Source of My Authority/Expertise _____

A SURVEY MUST BE ATTACHED TO THIS FORM

INLAND SCIENCE AND ENGINEERING FAIR CERTIFICATION OF COMPLIANCE OF RESEARCH INVOLVING HUMAN SUBJECTS

Projects involving human subjects may have additional requirements that are being considered by the state.

Name of Student _____

Project Title _____

Because federal regulations have become increasingly more rigid, students must plan carefully before undertaking research which involves the use of human subjects in either behavioral or biomedical studies. This will protect subjects from unnecessary exposure to physical or psychological risks and experimenters and schools from legal complications.

A human subject is legally defined as a person about whom an investigator (professional or student) conducting scientific research obtains (1) data through intervention or interaction with the person or (2) identifiable private information.

A subject at risk is legally defined as: Any individual who may be exposed to the possibility of injury, including physical, psychological or social injury, as a consequence of participation as a subject in any research.

Students using human subjects must comply with all regulations that reflect the will of society and plan proper methodology for the protection of those subjects. It is essential that they be alert to humane concerns at all times.

The following steps must be taken before any student begins research involving subjects:

1. **The student completes the "Research Plan" section of this form and submits it to the sponsoring teacher.**
2. **The sponsoring teacher reviews the "Research Plan" and determines if ANY POTENTIAL physical psychological, or social risk is involved (as defined in subject at risk above).**
   a) **If none is apparent, the teacher signs the certification. (No additional certification is necessary.)**
   b) **If any question exists, the student must redesign the experimental study or plan a different study.**

NOTE: Any project involving human subjects that is developed with the advice and assistance of personnel at a medical/scientific organization must comply with any regulations of that organization requiring approval of its Institutional Review Board and Informed Consent Certification.

RESEARCH PLAN

Describe proposed experimental procedures:

Inland Science & Engineering Fair
Certification of Compliance of Research Involving Human Subjects (continued)

Explain why human subjects are proposed for this experimentation:

Describe and assess any potential risk (physical, psychological, social, legal or other):

Describe the potential benefits to the individual or society:

Signature of Student _____ Date _____

CERTIFICATION

CERTIFICATION BY TEACHER/ADVISOR of compliance with federal regulations for the protection of human subjects in behavioral and biomedical research. (Must be completed before the start of experimentation).

I certify that, upon reviewing this research plan, I found that the experimental procedures constitute no physical, social, or psychological risk to either experimenter or subjects.

I agree to supervise this experimentation and will ensure that it is conducted in a humane, risk-free manner.

Signature _____

Name (type or print) _____

Title _____

Institution _____ Phone _____

Institution Address _____

Home Address _____

Home Phone _____ Date _____

Source of My Expertise/Authority _____

Note:
This form, properly completed, must be part of the carefully planned procedures of any experiment involving human subjects. It must accompany any such project exhibited at, or presented for, any public display with the Inland Science and Engineering Fair.

INLAND SCIENCE AND ENGINEERING FAIR

CERTIFICATION OF TISSUE SAMPLE SOURCE

This form must be completed for all projects using tissue(s), organ(s), human part(s), or animal parts, including blood.

Name of Student _____

Project Title _____

When live or preserved tissue samples or parts of human or vertebrate animals are obtained by the student from an institution or biomedical scientist, a statement signed by the adult providing the tissue is required. Students may NOT be involved in the direct acquisition of these samples from living human or other vertebrate animals.

Live tissue samples must be:

a) from a continuously maintained tissue culture line already available to institutional researchers, OR
b) from animals already being used in an on-going institutional research project.

RESEARCH PLAN

1. Tissue(s), organ(s), or part(s) used: _____ _____

   Tissue sample is from:
   ____ Human source_____Vertebrate animal source

   Genus, species and common name

2. Starting Date: _____ _____

3. Purpose of Project: _____

   _____

   _____

4. List objectives of the experiment and describe fully the methods and techniques involved:

   _____

   _____

   _____

   _____

Signature of Student _____ Date _____

Inland Science and Engineering Fair
Certificate of Tissue Sample (continued)

CERTIFICATION

Institution or company that is source of Tissue Sample:

Name _____

Address _____

_____

I certify that the above listed materials were provided by me or my institution and that the student listed was NOT involved in the direct acquisition of the samples provided or purchased.

_____ _____
Signature Title

_____ _____
Date Telephone Number

PROJECT ABSTRACT EXAMPLES

Your abstract is important. Your judges will receive this abstract in advance of the Fair so they can preview your work. Your judges will be able to better understand your work and prepare for your interview if you follow these samples or use similar formats.

What Makes Good Electrical Conductors?
Grades 4-5

Objectives/Goals: The objective of my project is to determine which materials make the best electrical conductors.

Methods and Materials: I used wood, plastic, copper, steel, tin, and grass as my materials to be tested. I also used a volt/ohms meter and the test probes to make my measurements.

Results: The meter I used showed the metals to all be excellent conductors and that the plastic and wood did not conduct an electrical current.

Conclusions: My conclusion is that the metals I tested are excellent conductors of electrical current and that neither wood or plastic conducts electricity.

The Effect of Surface Finish on Rocket Drag
Grades 6-12

Objectives/Goals: My project was to determine if surface finish has an effect on the drag of a model rocket. I believe that a model with a smooth surface will have lower drag and will reach higher altitudes.

Methods and Materials: Five model rockets with identical size and shape, but different surface preparations, were conducted. One rocket was left with an unfinished surface, three had surfaces finished to various degrees of smoothness, and the fifth rocket had its surface sealed, primed, sanded to 600 grit, painted, and covered with clear gloss. The rockets were ballasted to weigh the same and flown 10 times each with B5-4 motors.

Results: The rocket with the clear gloss finish consistently reached the highest altitudes of all 5 rockets, while the unfinished rocket consistently reached the lowest altitude.

Conclusions: My conclusion is that surface finish has an important role in model rocket drag

CALIFORNIA STATE SCIENCE FAIR
2014 APPLICATION ACCEPTANCE CRITERIA
(District/School Coordinator and Teacher Information)

Submission of an Application to the California State Science Fair does not guarantee acceptance to the fair. The Fair has always rejected applications on the basis of inappropriate content and for violations of Fair regulations. Projects which are substandard (poor quality) or incomplete will also be rejected. The basis for this judgement of quality is exclusively the Application Form and Project Summary on its reverse side, particularly the Project Abstract. The California State Science Fair does not consider other submitted materials or awards won at affiliated fairs.

The following is the official list of acceptance criteria:

1. Acceptance to present a project at the California State Science Fair requires the approval of an Application submitted by the student(s).
2. Applications without a Project Abstract will be rejected without recourse to appeal. Each student on a team project must complete his/her own personal Application, but the Project Abstract need only be supplied by one member of the team. As long as the Abstract is provided by at least one member, other members of the team may choose to provide or omit the Abstract without penalty.
3. Abstracts must demonstrate a level of knowledge and investigation that is appropriate or the grade of the student and discipline and which is beyond what is considered common knowledge. In other words, the investigations must demonstrate knowledge that is not found in middle or high school textbooks.
4. Abstracts must communicate ideas effectively, use standard English, and be legible.
5. The methodology and experimental design should be appropriate for the student's grade and discipline, and should include the following where appropriate:
   ~ experiments are appropriate to achieve the stated objective;
   ~ the sample size and/or number of trials is sufficient for projects where replication is necessary to establish validity;
   ~ the statistical analysis is appropriate for the student's grade and discipline; the conclusion is relevant to the stated hypothesis.
6. Projects which are merely demonstrations, display collections, and literature searches are generally not acceptable. In order to be acceptable, the student must use the demonstrations, collection, or search results, to extract new information not previously known to the student.
7. Applications may be rejected for failing to satisfy the rules of the Fair.
8. The Application fees are not refundable if the application is rejected.
9. All rejected Applications will be reviewed by the Directors of Judging and are subject to appeal (with the exception of those applications which do not contain an Abstract).

Students, parents, and advisors should be aware that these acceptance criteria are not intended to limit the number of participants but rather, by requiring higher standards for project abstracts, to improve the quality of the Fair and to ensure that all participants are able to effectively communicate their projects to the judges. Only a small percentage of applications have ever been identified as likely to be rejected. Every Application so identified this year will be contacted in a timely manner.

AWARDS FOR PARTICIPATION IN THE INLAND SCIENCE AND ENGINEERING FAIR

1. The most valuable aspect of the Fair may well be the opportunity to meet and share experiences with students and judges possessing similar interests.

2. Gold, silver, and bronze medals will be awarded in each category for each division. Sweepstakes trophies in each division may be awarded, as deemed appropriate by the judges. **All decisions are final.**

3. Special achievement awards will be provided by representatives of agencies and are awarded by criteria established by the agencies. Special achievement awards are independent of selections made by the Inland Science and Engineering Fair judging process.

4. Judges provided by the Inland Science and Engineering Fair shall select projects (in keeping with state criteria) to receive a "Recommendation for Advancement." This award will be an authorization or recommendation to participate in the California State Science Fair (CSSF). A regional recommendation is required for CSSF participation. Projects nominated for participation in the California State Science Fair will be forwarded by the directors of the Inland Science and Engineering Fair upon recommendations by the judges. **All decisions of the committee are final.**

Judging Criteria

The following evaluation criteria are used for judging at the Hemet Unified School District Fair. As shown below, science and engineering have different criteria, each with five sections as well as suggested scoring for each section. Each section includes key items to consider for evaluation both before and after the interview.

Students are encouraged to design their posters in a clear and informative manner to allow pre-interview evaluation and to enable the interview to become an in-depth discussion. Considerable emphasis is placed on two areas: *Creativity* and *Presentation,* especially the *Interview* section, and are discussed in more detail below.

Creativity: A creative project demonstrates imagination and inventiveness. Such projects often offer different perspectives that open up new possibilities or new alternatives. Judges should place emphasis on research outcomes in evaluating creativity.

Presentation/Interview: The interview provides the opportunity to interact with the finalists and evaluate their understanding of the project's basic science, interpretation and limitations of the results and conclusions.

- If the project was done at a research or industrial facility, the judge should determine the degree of independence of the finalist in conducting the project, which is documented on Form 1C.
- If the project was completed at home or in a school laboratory, the judge should determine if the finalist received any mentoring or professional guidance.
- If the project is a multi-year effort, the interview should focus ONLY on the current year's work.
- Please note that both team and individual projects are judged together, and projects should be judged only on the basis of their quality. However, all team members should demonstrate significant contributions to and an understanding of the project.

Judging Criteria for Science Projects

Project # _____

I. Research Question (10 pts)

___ clear and focused purpose
___ identifies contribution to field of study
___ testable using scientific methods

II. Design and Methodology (15 pts)

___ well designed plan and data collection methods
___ variables and controls defined, appropriate and complete

III. Execution: Data Collection, Analysis and Interpretation (20 pts)

___ systematic data collection and analysis
___ reproducibility of results
___ appropriate application of mathematical and statistical methods
___ sufficient data collected to support interpretation and conclusions

IV. Creativity (20 pts)

___ project demonstrates significant creativity in one or more of the above criteria

V. Presentation (35 pts)

a. Poster 10 pts)

___ logical organization of material
___ clarity of graphics and legends
___ supporting documentation displayed

b. Interview (25 pts)

___ clear, concise, thoughtful responses to questions
___ understanding of basic science relevant to project
___ understanding interpretation and limitations of results and conclusions
___ degree of independence in conducting project
___ recognition of potential impact in science, society and/or economics
___ quality of ideas for further research
___ for team projects, contributions to and understanding of project by all members

Judging Comments:

Category	Points Earned	Points Possible
Research Question		10
Design & Methodology		15
Execution: Data Collection, Analysis & Interpretation		20
Creativity		20
Presentation: Poster		10
Presentation: Interview		25
Points Total		**100**

Judging Criteria for Engineering Projects

Project # _____

I. Research Problem (10 pts)

___ description of a practical need or problem to be solved
___ definition of criteria for proposed solution
___ explanation of constraints

II. Design and Methodology (15 pts)

___ exploration of alternatives to answer need or problem
___ identification of a solution
___ development of a prototype/model

III. Execution: Construction and Testing (20 pts)

___ prototype demonstrates intended design
___ prototype has been tested in multiple conditions/trials
___ prototype demonstrates engineering skill and completeness

IV. Creativity (20 pts)

___ project demonstrates significant creativity in one or more of the above criteria

V. Presentation (35 pts)

a. Poster (10 pts)
___logical organization of material
___clarity of graphics and legends
___ supporting documentation displayed

b. Interview (25 pts)
___ clear, concise, thoughtful responses to questions
___ understanding of basic science relevant to project
___ understanding interpretation and limitations of results and conclusions
___ degree of independence in conducting project
___ recognition of potential impact in science, society and/or economics
___ quality of ideas for further research
___ for team projects, contributions to and understanding of project by all members

Judging Comments:

Category	Points Earned	Points Possible
Research Question		10
Design & Methodology		15
Execution: Construction & Testing		20
Creativity		20
Presentation: Poster		10
Presentation: Interview		25
Points Total		**100**