

13. Fair officials reserve the right to remove any project or item(s) which they deem hazardous or inappropriate, including cell phones found to be in use during judging.
14. The following items may **NOT** be displayed and are not allowed in the Science Fair premises.
 - a. Anything you cannot afford to lose. The Science Fair does not take responsibility for lost or stolen items.
 - b. Contraceptives.
 - c. Cultures of bacteria or molds.
 - d. Hazardous or otherwise dangerous materials or items. This includes glassware, mercury, medicines of any kind, controlled substances, and materials which are corrosive (such as acids), easily flammable, toxic (poisonous), radioactive, or carcinogenic (cancer causing). Any substance labeled "keep out of reach of children" is considered potentially hazardous.
 - e. Human parts.
 - f. Hypodermic syringes.
 - g. Live animals, plants or food, or other living things.
 - h. Preserved animals, including animal parts or fluids (examples: teeth, blood, other body fluids, bones, feathers, animal tissue).
 - i. Sharp items such as razor blades, knives, and dissection kits.
 - j. Soil.
 - k. Unlabeled containers.
 - l. Photographs, drawings, or descriptions which are offensive.
15. At least five (5) copies of your abstract must be available at your display. You will give one of these to each judge when he/she interviews you.

IMPORTANT: LOSS OR DAMAGE Valuable equipment, such as computers or scientific instruments, may be used as part of the display only if the **student participant** takes full responsibility for any loss or damage. Any valuable items should be on display only when the student is present, including the judging period. The Kern County Regional Science Fair assumes no responsibility for loss or damage of any project or a part of any project. Students should retain copies of their laboratory notebooks and other printed materials.

Categories

Science Fair officials will review all Project Abstracts and assign projects to the appropriate categories. Intermediate Division categories may include, but are not limited to: Animal Sciences, Behavioral Sciences, Biochemistry, Cellular and Molecular Biology, Chemistry, Computer Science, Earth and Planetary Science, Energy and Transportation, Engineering: Electrical and Mechanical, Engineering: Materials and Bioengineering, Environmental Management, Environmental Sciences, Materials and Product Science (Grades 4-8 only), Mathematical Sciences, Medicine and Health Sciences, Microbiology, Physics and Astronomy, and Plant Sciences. The Science Fair officials may develop additional categories as needed.

Awards

A certificate of participation will be presented to each exhibitor. Medallions will be presented to the top three projects in each category or group of categories if they are combined for judging. Honorable mention ribbons may be awarded to other students at the discretion of the judges. Scholarships may be available through the Kern County Science Foundation for high school seniors. For information see <https://kern.org/science-foundation/scholarships/> First and second place winners in each category in the middle school and senior high school divisions *may be* eligible to participate in the CA State Science Fair. However, being in a category with a limited number of entries does NOT mean an automatic invitation to the CA State Fair. Judges are asked to recommend which projects should advance to State competition. Additional awards, some monetary, are often presented in addition to the above listed awards to individuals or even schools.

Participation in the CA State Fair is optional. Application fees, deadlines, transportation and housing are the responsibility of the participant.

5. For team projects, one person could act as the team spokesperson and present the oral summary or this job could be shared among the team members. In any case, all team members should understand their roles clearly and be able to carry them out. This summary should include the rationale for the project being a group, rather than an individual, enterprise, and how each member contributed. Each member of the group should be fully knowledgeable about the project and be prepared to discuss his/her part.
6. You will be interviewed by at least two different judges for your category who will spend about five to eight minutes discussing your project with you. The judges may talk to you one at a time or in groups. It is difficult to space these interviews equally, so don't get discouraged if there is a long wait between judges. Don't worry about comparing the number of your judging sessions with your neighbors. You, or they, may be getting Special and Recognition Awards interviews.
7. Many judges prefer to learn about your project by asking questions. Be prepared for them to interrupt your presentation.
8. You probably will not be able to predict all of the questions you will be asked. Some of the judges are experts in their fields, so they may ask you questions you cannot answer. Don't let this bother you. Just answer truthfully and to the best of your ability. If you don't know the answer to a question, say so. DO NOT try to "snow" or bluff a judge.
9. The Kern County Regional Science Fair is a major local event. Your interviews with the judges might be covered by newspaper reporters (some with photographers), radio reporters, TV cameras (with their bright lights) and others. Videos might be used in promotional materials for future science fairs.

The above section was adapted and revised from material first prepared for the California State Science Fair.

Restricted Projects

A restricted project is any project which may require additional adult supervision due to potentially harmful materials or machinery (ie., firearms), handling of non-human vertebrates, or topics involving human subjects. All restricted projects require special approval **before you can begin**. Project supervision by a Qualified Scientist or Designated Supervisor is required. In addition, approval by the school Institutional Review Board and/or the Scientific Review Committee sometimes will be needed. Project advisors, whether they are teachers or qualified scientists/designated supervisors, must certify their approval(s) through the online registration system that the student has complied with all project regulations.

The **Qualified Scientist** must possess an advanced earned degree (examples, Ph.D., M.D., D.D.S.) in a field related to the project. Further, he/she must be familiar with all regulations - local, state and federal - which relate to that project. The Qualified Scientist and the Teacher/Adult Sponsor may be the same person if qualified as indicated above, as long as that person is not the student's parent.

Designated Supervisor supervises the work approved by the Qualified Scientist. Generally this person will have practical experience related to the specific project to be supervised. Such projects can include those involving DNA, animal tissues, human research, hazardous materials, toxins, or controlled substances.

Designated supervisors might be 4-H project leaders, butchers, farm advisors, single subject credentialed teachers, police officers, or others, depending on the project. The Teacher/Adult Sponsor may act as a Designated Supervisor.

Scientific Review Committee (SRC) This committee is convened by Kern County Superintendent of Schools and reviews all Restricted Projects. Its formal approval is required for some projects.

In general terms, the Designated Supervisor is the person who promises to provide additional supervision in the course of a project. That can include anything necessary to insure a student's safety. Examples might

be overseeing a student who is using bleach, lighting a match or climbing a ladder. If a student is surveying strangers, the Designated Supervisor would remain nearby in order to guarantee that the student is in a safe environment.

A project which requires a Qualified Scientist is one which needs a higher level of scientific oversight. Examples might include supervision for a student handling chemicals or medications. Projects using animals would need a scientist willing to oversee the humane treatment of those animals.

The County's Scientific Review Committee will evaluate the risks associated with each project and determine if there is a need for either a Designated Supervisor or a Qualified Scientist. The decisions of the Committee are final.

The following pages include descriptions and the forms/approvals needed for each type (I-VIII) of restricted project. These have been included in the forms section of this booklet.

I. Human Subjects (includes sections A, B and C)

- o Approval by the school Institutional Review Board (IRB)
- o Completion of the following forms:
 - Qualified Scientist or Designated Supervisor Form
 - Human Subjects Form
 - Informed Consent Form
 - Human, Animal Tissue, and Microorganisms Form, if using human tissue

A. Rules

1. All research projects involving human subjects must be reviewed and approved by an Institutional Review Board (IRB) before the research begins. IRB is established at each school site.
2. Human subjects research includes projects involving: Subjects participating in physical activities (e.g., physical exertion, ingestion of any substance, any medical procedure), psychological and opinion studies (e.g., survey, questionnaire, test of any kind), behavioral observations, studies in which the researcher is the subject of the research.
3. When developing the Research Plan student researchers must evaluate and minimize the physical and/or psychological risks to their human subjects.
4. The documentation of written Informed Consent is required for most projects. Children/Minors participating in most research will require special consent procedures including assent of the child/minor and consent of the parent/guardian. Children/Minors are persons who have not attained the legal age for consent; in most jurisdictions the legal age is 18.
5. Research conducted by a pre-college student at federally registered research institutions (e.g., universities, medical centers, NIH, correctional institutions, etc.) must be reviewed and approved by that institution's IRB. A copy of the IRB approval for the entire project (which must include the research procedures/measures the student is using) or an official letter from the IRB attesting to this approval is required. A letter from the mentor is not sufficient documentation of IRB review and approval.
6. A student may observe and collect data for analysis of medical procedures and medication administration only under the direct supervision of a qualified professional. The qualified professional must be named in the research protocol to be specifically approved by the IRB. Students are prohibited from administering medications and performing medical procedures on human subjects. The IRB must confirm that the student is not violating the medical practice act of the particular state or nation in which he/she is conducting the research.
7. Student researchers may NOT publish or display information in a report that identifies the human subjects directly or through identifiers linked to the subjects (including photographs), without written consent. (Public Health Service Act, 42, USC 241 (d)).
8. All standardized tests that are not in the public domain must be administered, scored and interpreted by a qualified scientist as required by the instrument publisher. Any and all use and distribution of the test must be in accordance with the publisher's requirements, including procurement of legal copies of the instrument.

9. The use of the Internet to obtain data for human subjects research is permissible. The Student Researcher, Adult Sponsor and IRB must take additional care to ensure that survey responses remain confidential and that, when required, informed consent is documented.
10. Any proposed changes to a previously approved research plan must be resubmitted to the IRB for another complete review. The proposed changes must not be implemented until the modified project is approved by the IRB.

B. Risk Evaluation

Once a study population is chosen, the student researcher must assess any potential physical and/or psychological risks when developing the research plan. In evaluating risk, students and IRBs must use the following federal definition of minimal risk as a guide: No more than minimal risk exists when the probability and magnitude of harm or discomfort anticipated in the research are not greater (in and of themselves) than those ordinarily encountered in DAILY LIFE or during performance of routine physical or psychological examinations or tests.

Risk Groups The following risk groups require additional safeguards because they have been judged as vulnerable to coercion or undue influence:

1. Any member of a group that is naturally at-risk (e.g., pregnant women, individuals with diseases such as cancer, asthma, diabetes, cardiac disorders, psychiatric disorders, dyslexia, AIDS, etc.).
2. Special vulnerable groups that are covered by federal regulations (e.g. children/minors, prisoners, pregnant women, mentally disabled persons, or economically or educationally disadvantaged persons).

Risk Activities The following are examples of activities that contain more than minimal risk:

1. Physical
 - a. Exercise other than ordinarily encountered in DAILY LIFE by that subject.
 - b. Ingestion of any substance or exposure to any potentially hazardous materials.
2. Psychological
 - a. Any activity (e.g. survey, questionnaire, viewing of stimuli) or experimental condition that could potentially result in emotional stress. For example, answering questions related to personal experiences such as sexual, physical or child abuse and divorce and/or psychological well-being (e.g. depression, anxiety, suicide) must be considered more than minimal risk. Additionally, research activities that involve exposing subjects to stimuli or experimental conditions that could potentially result in emotional stress must also be considered more than minimal risk. Examples include violent or distressing video images, distressing written materials or activities that could potentially result in feelings of depression, anxiety, or low self-esteem in subjects.
 - b. Any activity that could potentially result in negative consequences for the subject due to invasion of privacy or breach of confidentiality. When research activities involve collection of personal information (e.g. history of abuse, drug use, opinions, fingerprints) or health-related data (genetic material, blood, tissue) the researcher must consider risks related to invasion of privacy and possible breach of confidentiality. Ways to reduce these risks include collecting data anonymously or developing data collection procedures that make it impossible to link any identifying information (e.g. subject's name) with his/her responses or data.

C. Informed Consent

The process of obtaining informed consent provides information to the subject about the risks and benefits associated with participation in the research study and allows the subject to make an educated decision about whether or not to participate. Informed consent is an on-going process, not a single event that ends with a signature on a page. It must incorporate procedures that do not involve coercion or deception.

Documentation of informed consent is required.

If a research subject is under 18 years of age, both the parent/legal guardian and the school age research subject must sign the Informed Consent Forms. In some cases, the Scientific Review Committee

may allow a roster of names, rather than an individually signed form from each participant. For surveys needing to protect the anonymity of participants, the Scientific Review Committee may allow the student researcher to assign numbers to participants. An individual determination will be made for each proposed research study.

Patient Privacy HIPAA, the Health Insurance Portability and Accountability Act, as well as the Code of Federal Regulations 45 CFR 46 §46.102 now have **very strict regulations on research on human subjects and privacy rights**. It is essential that any projects involving human subjects comply with these regulations. Regulations involving humans as the subject of research:

The Code of Federal Regulations 45 CFR 46 §46.102 defines:

"Human Subject" means a living individual about whom an investigator (whether professional or student) conducting research obtains (1) data through intervention or interaction with that individual, or (2) identifiable private information. In order for the obtaining of private information to constitute research involving human subjects, the identity of the subject must be readily associated with the information.

"Minimal Risk" means that the risks of harm anticipated in the research are not greater, considering probability and magnitude, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests. Examples of unacceptable risk include: (1) ingestion or physical contact with any potentially hazardous materials including toxic chemicals, known or suspected pathogens or carcinogens, or exposure to ionizing radiation; (2) intentionally inducing emotional stress through questioning or invasion of privacy; (3) physical stress to pregnant women or anyone suffering debilitating physical illness; and (4) psychological stress to the mentally handicapped or those suffering psychiatric disorders. This list is intended to be illustrative, not exhaustive.

The regulations of the Fair are intended to protect human subjects, both physically and psychologically. The regulations supplement, and do not supplant, relevant State and Federal regulations dealing with such protection.

II. Nonhuman Vertebrate Animals

Approval by the IRB

Completion of the following forms:

- o Qualified Scientist or Designated Supervisor Form
- o Certification of Humane Treatment of Live Animals Form

This includes live, nonhuman vertebrates, mammalian embryos or fetuses, bird eggs within three days of hatching, and all other vertebrates (fish, amphibians, reptiles, etc.).

Field Studies

These are observational, behavioral, and natural history studies that do not affect an animal's health or well-being.

Animal Experimentation

These are research projects other than field studies and must adhere to the guidelines outlined below.

Students proposing research on nonhuman vertebrate animals first should explore all possible alternatives. These may include cells and tissue cultures, plants (including lower plants such as yeast or fungi), mathematical or computer models, invertebrates with either no nervous systems or primitive ones (i.e., protozoa, planaria, or insects), or chicken embryos prior to three days of hatching.

If vertebrates are used for research and testing, the student and his/her Teacher/Adult Sponsor are responsible for maintaining the well-being, comfort, and humane treatment of the animals before, during, and after the research. Every effort should be made to reduce the number of animals involved and refine procedures to minimize their distress. In addition:

All research animals must be legally acquired from reputable animal breeders; wild animals may not be used for experiments (see field studies, above, for exception).

Experiments involving small common animals such as mice, rats, hamsters, guinea pigs, gerbils or rabbits are only allowed in an institutional or school setting, and not in a student's home (see field studies, above, for exception).

Regulations for projects using any live vertebrate animal, excluding humans:

The State of California Education Code §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 practices of animal husbandry.

III. Pathogenic Agents

Approval by the IRB

Completion of the following forms:

- o Qualified Scientist Form
- o Human, Animal Tissue, and Microorganisms Form
- o Human Subjects Form, if humans are part of the experimentation
- o Informed Consent Form, if humans are part of the experimentation
- o Certification of Humane Treatment of Live Animals Form, if non-human vertebrates are part of the experimentation

Any bacteria, viruses, rickettsia, fungi, molds, or parasites collected, isolated and/or cultured from any environment during student research projects should be considered potentially pathogenic (disease causing). **No research will be allowed on unknown bacteria. This includes swabbing surfaces and culturing them to try to find out what germs are present. Research using bacteria will be allowed only on known strains which are non-pathogenic. The research must be under the supervision of a trained teacher or qualified scientist, and Federal regulations must be followed.** For example, the effectiveness of an antiseptic may be tested using a known non-pathogenic strain acquired from a scientific source such as Flinn Scientific or Carolina Biological.

Students working with any microorganisms must always follow standard microbiological practices (for example, National Institute of Health and National Association of Biology Teachers guidelines). **Students must not use ethidium bromide or handle gels stained with ethidium bromide.** All research must be conducted under the direction of a Qualified Scientist in a laboratory setting.

IV. Recombinant DNA

Approval by the IRB

Approval by the Scientific Review Committee

Completion of the following forms:

- o Qualified Scientist or Designated Supervisor Form
- o Human, Animal Tissue, and Microorganisms Form
- o Human Subjects Form, if humans are part of the experimentation
- o Informed Consent Form, if humans are part of the experimentation
- o Certification of Humane Treatment of Live Animals Form, if non-human vertebrates are part of the experimentation

Students working with any microorganisms, whether or not they involve DNA, must always follow standard microbiological practices (for example, National Institute of Health and National Association of

Biology Teachers guidelines). **Students must not use ethidium bromide or handle gels stained with ethidium bromide.**

Recombinant DNA studies may be conducted on bacterium *Escherichia*, bacterium *Bacillus subtilus*, and yeast *Saccharomyces cerevesiae* in non-federally registered laboratories, including school laboratories, under the direct supervision of a trained teacher following federal regulations. Students wishing to study non-exempt forms must work only in a federally registered research institution under the direct supervision of a Qualified Scientist.

V. Human and Animal Tissue:

Approval by the IRS

Approval by the Scientific Review Committee (exceptions: see following page)

Completion of the following forms:

- o Qualified Scientist or Designated Supervisor Form
- o Human, Animal Tissue, and Microorganisms Form

This includes all human or vertebrate animal tissue and body fluids (for example, saliva and urine).

Some tissue types do not require prior SRC review and approval:

Established cell and tissue cultures (e.g., those obtained from the American Type Culture Collection with culture source and number identified)

- **USDA approved meat or meat by-products from food stores, restaurants or packinghouses.**

Although students using their own blood do not need HIV or hepatitis certifications, students wishing to conduct research on human blood, blood products or other body fluids not their own may do so only under the following conditions: a) tissue fluids are documented to be free of HIV and hepatitis B and C before the student receives them, or b) tissues are handled in accordance with standards and guidelines set forth in OSHA, 29CFR, Sub-part Z, 1910.1030 – *Blood Borne Pathogens*.

Regulations for projects using tissue samples:

Live tissue samples must be taken either from a continuously maintained tissue culture line already available to institutional researchers, or from animals already being used in an on-going institutional research project. **Students may not be involved in the direct acquisition of these samples from living human or vertebrate animals.**

VI. Controlled Substances

Approval by the IRS

Completion of the following forms :

- o Qualified Scientist or Designated Supervisor Form
- o Human Subjects Form, if humans are part of the experimentation
- o Informed Consent Form, if humans are part of the experimentation
- o Certification of Humane Treatment of Live Animals Form, if non-human vertebrates are part of the experimentation

Projects using controlled substances are not allowed, but surveys of adult users of such substances are permitted. Drug Enforcement Administration classified substances, prescription drugs, alcohol, and tobacco must be acquired and used according to existing local, state, and federal laws. Students under 21 years of age are prohibited from purchasing and/or handling smokeless powder or black powder.

Conclusions and discussion-Relate your experimental results to your hypothesis, objective or goal. Do the results support it, not support it, or are they inconclusive? What did you find out from your project? What might you do differently next time? What further hypotheses and experiments might you do to learn more? What new science did you learn from the project? Example: *White cars are easier to see than black ones. {Based on the limited sample of other colors, it seems that lighter cars in general are easier to see than darker ones. Therefore I can conclude that my experimental results support my hypothesis. In the future I might do experiments using more car colors which are similar except for their brightness, using various shades of gray, for example. This would eliminate the effect of color on people 's ability to see the cars. Because I did not get the same results with males and females, I learned that there is a possibility that gender differences affect how people see. I might want to test this by using greater numbers of males and females.*

Example of completed abstract

The objective of this project was to determine if a lighter colored automobile could be seen from farther away than a darker one. Five automobiles, identical except for color, were driven between two marked locations four miles apart. Twenty people, equal numbers of males and females, observed the automobiles from the same location at the same time on a cloudless day. Each person recorded the time when she or he first saw each automobile. All observers were between the ages of 15 and 17. The results showed that 70% of the males and 90% of the females saw the white car first; 90% of males and 60% of females saw the black car last and none saw it first. Most saw the other cars in the following order: light blue and gray the same, then metallic orange. Based on the limited sample of colors, it appears that lighter colors are easier to see than darker ones. Therefore the hypothesis was supported. Further experiments might use additional colors, which are similar except for brightness, various shades of gray, for example. Because the results for males and females were different, further experiments could test this by using greater numbers of males and females.

Help received-Describe any help received while conducting the project. Although the project must be the work of the student, some help is allowed. However, there must be a clear distinction between the work of the student and others. Students participating in a research opportunity in industry, a university, or other institutions besides their school must display only their own research. If a student does a project of this type, the project documentation must include a letter from the principal researcher indicating the level of his/her involvement in the student's project.

INFORMATION FOR RESTRICTED PROJECTS

If you have ever puzzled over the difference between a Designated Supervisor and a Qualified Scientist, this clarification may be helpful:

In general terms, the Designated Supervisor is the person who promises to provide additional supervision in the course of a project. That can include anything necessary to insure a student's safety. Examples might be overseeing a student who is using bleach, lighting a match or climbing a ladder. If a student is surveying strangers, the Designated Supervisor would remain nearby in order to guarantee that the student is in a safe environment.

A project which requires a Qualified Scientist is one which needs a higher level of scientific oversight. Examples might include supervision for a student handling chemicals or medications. Projects using animals would need a scientist willing to oversee the humane treatment of those animals.

The County's Scientific Review Committee will evaluate the risks associated with each project and determine if there is a need for either a Designated Supervisor or a Qualified Scientist. The decisions of the Committee are final.

**At the Science Fair
A Checklist for Students**

DO bring:

- Chairs for Students
- Snacks (for breaks only; not allowed on floor)
- Plastic water bottles, to be stored under the displays
- Lunch or lunch money
- Something to keep students busy during judging intervals
- Log Books and .§ copies of abstract
- Contact phone number for adult chaperone
- Extension cord if electricity has been requested

Do NOT bring:

- Glass
- Liquids
- Live plants, dirt
- Display photos depicting anyone other than student
- Anything the student cannot afford to lose



2024 Kern County Regional Science Fair
School/District Intent to Participate Form
Deadline: Thursday, December 15, 2023

Please complete the following and email to Kristi Watkins, krwatkins@kern.org

School: _____ **District:** _____

Grade levels at this school (circle all that apply): 4 5 6 7 8 9 10 11 12

(Check all the boxes that apply)

- Our district will be having a district science fair and will send representatives to the Kern County Regional Science Fair. Projects must be registered by January 26, 2024.
- Our school site will be having a school science fair and will send representatives to the Kern County Regional Science Fair. Projects must be registered by January 26, 2024.
- Our school/district **WILL** or **WILL NOT** allow students to do research on Restricted Projects. The deadline for Restricted Projects submission is January 26, 2024.

ALL COACHES SHOULD PLAN TO ATTEND THE SCHEDULED SCIENCE FAIR VIRTUAL WORKSHOP MEETING TUESDAY, SEPTEMBER 19, 2023 from 4:00 – 5:00 pm. This meeting is strongly encouraged for those submitting Restricted Projects.

Our 2024 Kern County Regional Science Fair contact person is:

Name: _____

Email: _____

Administrator's Signature: _____

Date: _____

