



Los Angeles County Science & Engineering Fair

Inspiring Student Discovery & Innovation

1107 Fair Oaks Ave. # 94, South Pasadena, CA 91030

www.lascifair.org

*This is a **fillable PDF**. Please **download** this document to your device and enter your responses in the given boxes. You do not need to complete the form in one sitting. Choose Save to save your progress. Once you complete the form, get it approved by your adult supervisor and site coordinator **BEFORE** you go online to complete the online pre-approval form. You can then copy and paste your responses in the appropriate sections of the online form.*

Research Plan for Experiments with Hazardous Materials

GUIDELINES FOR HAZARDOUS MATERIALS AND SAFETY PRECAUTIONS

Students planning research must complete and obtain LACSEF Scientific Review Committee (SRC) approval of the Certification of Hazardous Chemicals, Activities or Devices before starting experiments.

The following are examples of precautions that must be taken to prevent injury to persons or the environment. No list could possibly foresee all possible hazards, so teachers, parents and students must carefully plan and follow safe procedures specific to each study. The methods and materials section of the project description must contain explicit and detailed statements as to how and where experiments will be conducted.

1. Approved eye- protective devices should be used by all persons performing science activities involving hazards to the eyes. All persons in close proximity must be similarly equipped. Laboratory aprons and rubber or plastic gloves should be available and should be worn whenever hazards exist that could damage clothing, injure someone or irritate skin.
2. Eyes and skin must not be exposed to ultraviolet light experimentally or accidentally as part of a project.
3. The use of [especially hazardous chemicals](#) should be avoided and substitutes used. If the use of certain hazardous chemicals such as gel preparations of acrylamide, a neurotoxin, or ethidium bromide (a mutagen) cannot be avoided, extra precautions must be exercised and the supervisor must perform any procedures involving exposure to these hazards. Consult materials [safety data sheets](#) (SDS) prior to use of any hazardous chemicals. Student use or handling of ethidium bromide or gels stained with ethidium bromide is prohibited. If a necessary part of the experiment, they must be handled only by qualified lab personnel trained in the standards for their use. Care must be taken that the student does not come into contact with them.
4. The use of [controlled substances](#) (drugs, chemicals, anesthetics, narcotics, etc. which are regulated by the comprehensive [Drug Abuse Prevention and Control Act of 1970](#)) must be in accordance with existing local, state and federal laws. See your pharmacist or write the department of health for information about these laws. **The use of many such substances is prohibited by the LACSEF.**

5. **Prohibited Research**

- A student may not directly handle [Liquid Nitrogen](#): a trained adult may handle it for the student.
 - State law [Education Code](#) also prohibits students from possessing, using, or distributing Alcohol and Tobacco, prescription drugs and other controlled substances, firearms and explosives –including airsoft guns, paintball guns, B.B. guns, pellet guns, air rifles, creating explosions or setting items on fire is strictly prohibited. M-80’s and Cherry Bombs are explosives.
 - **Exceptions:** using a fully assembled rocket motor, reload kit or propellant modules; burning food with a calorimeter.
 - If working with hazardous activities or devices that involve a level of risk above and beyond that encountered in the student's everyday life or whose operation requires a moderate to high level of expertise in order to ensure safety, the possible hazards and potential risks and necessary safety precautions must be assessed. Household items can be hazardous if used improperly. The supervising sponsor/advisor must assess the operation of a device that requires a moderate to high level of expertise to ensure safety. For example, hot plates and Bunsen burners may not require a documented risk assessment, whereas other devices such as high vacuum equipment, heated oil baths, NMR equipment, UV lights, lasers and high- temperature ovens require documentation of a risk assessment.
6. [This section of the Science Safety Handbook](#) describes the effects of poisonous plants.
- a. All projects involving venomous plants / animals require pre-approval for Hazardous Materials / Procedures
7. Projects involving soil samples from known or suspected contaminated areas require pre-approval for Hazardous Materials / Procedures
8. Projects involving target archery is allowed provided it is done with adult supervision (needs pre-approval)

| | |
|--------------------|--|
| Student Name | |
| School | |
| Email (non-school) | |

I certify that I have read and understand the guidelines for vertebrate research and safety precautions as outlined in the [LACSEF Rules and Regulations](#) (check box)

In addition to this plan, I have also completed the following research plan(s) for this project (check all that apply).

Microbes

Tissue, Cell Lines, Organs or Organ Parts

Human Subjects

Vertebrates

No other research plan was submitted

Project Title:

- Title must be limited to 150 characters (including spaces)

Problem

- In the form of a question

Objective(s)

- Your goal for the project - why is it important

Hypothesis

Number of Project Team Members

- This refers to the number of students conducting the project, not the number of test subjects.
- There are a maximum number of three students allowed on a project team..

Procedure/Experimental Techniques

- Provide a clear and detailed description/outline of proposed procedure, including experimental control groups, concentration/amount of chemicals, number of trials, equipment to be used, safety measures, and disposal of hazardous chemicals.
- List Hazardous Materials - List/identify the hazardous chemicals, activities, and devices that will be used, in detail. A proper list assessment of chemicals should include review of factors such as degree of toxicity, reactivity, flammability or corrosiveness.
 - **Toxicity** - the tendency of a chemical to be hazardous to health when inhaled, swallowed, injected or in contact with the skin.
 - **Reactivity** - the tendency of a chemical to undergo chemical change.
 - **Flammability** - the tendency of a chemical to give off vapors which readily ignite when used under normal working conditions.
 - **Corrosiveness** - the tendency of a chemical, upon physical contact, to harm or destroy living tissues or physical equipment.

Hazardous Material Source

- Describe the source of your materials (Full detail is required). Where did you buy or borrow the materials? Who purchased them or gave them to you? Give the institution or store name (an address or online URL if necessary).

Student Procedures

- Describe the procedures to be performed by the student.
- Notice: Students are prohibited from administering prescription drugs to human subjects and vertebrate animals. Exception: If a student is working with a veterinarian searching for a cure for his/her personal animal. Strict veterinary supervision is required.
- **Firearms and Explosives** - Prohibited for middle and high school students per California Education Code, Section 48915. Exception: a fully assembled rocket motor, reload kit, or propellant modules.
- **Alcohol and Tobacco** - Prohibited for middle and high school students per Title IV, Part A - Safe and Drug-Free Schools and Communities.

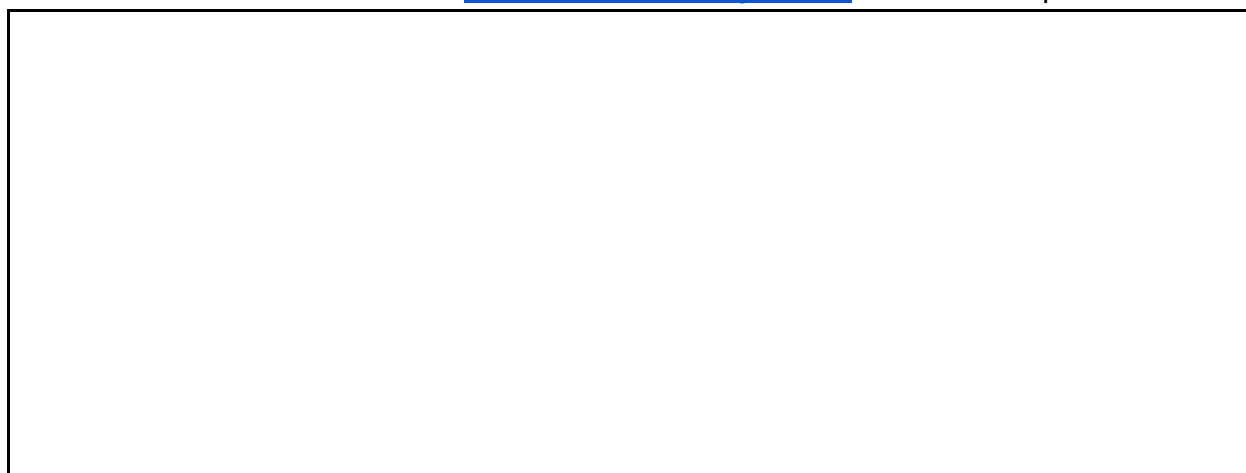
Supervisor Procedures

- Describe the procedures to be performed by the supervising scientist/adult supervisor.
- All studies using DEA-controlled substances must be supervised by a Qualified Scientist who is licensed by the DEA for use of the controlled substance.
- For all chemicals, devices or activities requiring a Federal and/or State Permit, the student/supervisor will be expected to have the permit prior to the onset of experimentation.

Risks and Safety Precautions

Risks

- Identify and assess the risks involved (for activities, devices or chemicals).
- If working with hazardous activities or devices that involve a level of risk above and beyond that encountered in the student's everyday life or whose operation requires a moderate to high level of expertise in order to insure safety, the possible hazards and potential risks and necessary safety precautions must be assessed.
- Household items can be hazardous if used improperly.
- The supervising sponsor/advisor must access the operation of a device that requires a moderate to high level of expertise to ensure safety. For example: hot plates and Bunsen burners may not require a documented risk assessment, whereas other devices such as high vacuum equipment, heated oil baths NMR equipment, UV lights, lasers and high-temperature ovens require documentation of risk assessment.
- The use of especially hazardous chemicals should be avoided and substitutes used. If the use of certain hazardous chemicals such as gel preparations of acrylamide, a neurotoxin, or ethidium bromide (a mutagen) cannot be avoided, extra precautions must be exercised and the supervisor must perform any procedure involving exposure to these hazards.
- When doing a risk assessment the type and amount of exposure to a chemical must be considered. For example, an individual's allergic and genetic disposition may have an influence on the overall effect the chemical may have. Consult Material Scientific Data Sheets (MSDS) prior to use of any hazardous chemicals.
- Student use or handling of ethidium bromide or gels stained with ethidium bromide is prohibited. If a necessary part of the experiment, they must be handled only by lab personnel trained in the standards for their use. Care must be taken that the student does not come into contact with them.
- A risk assessment must be conducted when a student uses non-ionizing radiation beyond that normally encountered in everyday life. Non-ionizing radiation includes the spectrum of ultraviolet (UV), visible light, infrared (IR), microwave (MV), radiofrequency (RF), and extremely low frequency *ELF). Lasers usually emit visible, ultraviolet or infrared radiation. See the [LACSEF Rules & Regulations](#) for more in-depth information.



COVID-19 Risks

Due to the special circumstances brought on by the COVID-19 pandemic, it is strongly recommended that ALL students include in their risk assessment how they will mitigate the spread of the disease while conducting their experiment. Such mitigations may be found at: <https://www.societyforscience.org/isef/covid-policy/>

Safety Precautions

- Describe in detail all safety precautions to be taken during procedures (be specific for each hazard involved).
- All persons performing science activities involving hazards to the eyes should use approved eye-protective devices. Eyes and skin must not be exposed to ultraviolet light experimentally or accidentally as part of a project. All persons in close proximity must be similarly equipped.
- Laboratory aprons and rubber or plastic gloves should be available and should be worn whenever hazards exist that could damage clothing, injure someone or irritate skin.
- Researchers should never look directly into a laser or a laser reflection thinking it is safe. Follow standard laser safety protocols to avoid laser exposure to bystanders.

Safety Information Sources

- Identify the safety information source you are using. Example: [Flinn Scientific searchable Material Scientific Data Sheets \(MSDS\)](#), [CSSS Science Lab & Prep Area Science Safety Guidance Resource](#), [CA Science Safety Guidelines](#), [Biosafety in Microbiological and Biomedical Laboratories \(BMBL\)](#), etc.

Disposal Methods

- Describe the disposal method(s) to be used for hazardous materials.
- The student researcher must design experiments to minimize the impact that an experiment has on the environment, for instance using minimal quantities of chemicals that must subsequently be disposed of in an environmentally safe manner in accordance with good laboratory practices.
- A risk assessment must include proper disposal methods for the chemicals used in an experiment. The [Flinn Scientific Catalog](#) provides good information for the proper disposal of chemicals. If applicable, the student researcher must incorporate in the research plan disposal procedure required by federal and state guidelines.
- Identify any hazardous disposal company or [local city hazardous material collection site](#) that will be used for disposal of any hazardous waste.

Bibliographic References

- Provide bibliographic references for your project.
- References should be written in APA format
- At least one reference must be from a source other than the internet.
- Junior Division projects require at least three references.
- Senior Division projects require five references.

Reference 1

Reference 2

Reference 3

Reference 4

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Reference 5

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Certification References

Please provide the email addresses for the people who will be serving in the following roles in your experiment. An email will be sent to each address with a link for the person to certify your project. You can see what [qualifications](#) each person needs on our website.

| Teacher/Advisor | |
|------------------------|--|
| Name | |
| Email Address | |
| Qualifications | |

| Biomedical Scientist | |
|-----------------------------|--|
| Name | |
| Email Address | |
| Qualifications | |

| Designated Adult Supervisor | |
|------------------------------------|--|
| Name | |
| Email Address | |
| Qualifications | |

By checking this box, I certify that the experimental procedures used in this project follow the rules and regulations of the LACSEF. I also certify that the procedure followed will ensure that neither the procedures nor the materials constitute any known danger and that all microorganisms, pathogenic or non-pathogenic, will be handled and disposed of as if pathogenic. I understand that this form must be approved and signed by all parties BEFORE the project can begin, and I will comply with all regulations.

If your project involves humans *in any way* you need to complete the **Human Subjects Form** at this [link](#)