



Safety in Experimentation

The safety of the student researcher, the test subjects (in cases of humans and vertebrate animals) and of the public are of paramount concern to Chicago Public Schools Student Science Fair, Inc. Projects using humans, vertebrates or potentially hazardous biological agents (including microorganisms, recombinant DNA, and human or vertebrate tissue) raise the greatest risks. For this reason, the plans for such projects must be reviewed by a team of qualified scientists and science teachers before experimentation or design construction begins. The Scientific Review Committee (SRC) serves this purpose. Projects that violate any of the rules for use of humans, vertebrates, microorganisms, recombinant DNA, human or vertebrate tissue, or firearms will be disqualified from the CPS Student Science Fair.

The Endorsement Process

1. Plan the project, check the rules

It is the responsibility of the teacher/sponsor working with the student to evaluate the research plan for any possible risks involved in order to ensure the health and safety of the student researcher, the test subjects and the public. The rules and guidelines on the following pages guide the student's project planning to produce a safe procedure for all concerned. These guidelines also help the student decide whether the project needs to be checked and approved (or endorsed) by the SRC. Projects (including use of humans, vertebrates, microorganisms, recombinant DNA, human or vertebrate tissue and firearms) most likely require an endorsement.

2. Request an endorsement = Ask for permission

To make sure the proposed project using humans, vertebrates or potentially hazardous biological agents is safe, the SRC needs to review the project details that pertain to safety risks and precautions BEFORE the student begins the experiment or design construction. On the endorsement request form the student explains the potentially hazardous aspects of the proposed project and what precautions are in place to prevent harm. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – **must be received by SRC by October 16, 2015**. Request for Use of Firearms Endorsement with all documents- **must be received by the SRC by October 30, 2015**. All endorsement requests which do not fall under the exception rule or use firearms **must be received the SRC by November 13, 2015**. **Endorsements must be typed**. Requests can be made in two ways. The endorsement requests can be accessed online at www.cssf.org, saved, printed, scanned and sent to the indicated email, or two copies of the completed typed request for endorsement form can be sent to the SRC committee member specified on the appropriate form (pages 63 - 76 of this handbook).

3. Review of the project plan

The SRC reviews the procedures and precautions on the request form. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature, the request form then becomes the endorsement. If the project is not safe the SRC will contact the student to notify him/her of the problem and that the project is not approved to begin experimentation or design construction. At this time the student and SRC can discuss safe alternatives. The student may then submit a new request for endorsement with the necessary revisions. The SRC will send back to the teacher/sponsor via GSR one of the two endorsements. The signed and stamped (in blue) endorsement must accompany the student's Research Summary at all science fairs. The other copy will be kept in SRC records.

4. Endorsement, then experiment

When the student has the SRC's signed and stamped endorsement the student may then begin the experiment or design construction as it has been assured to be safe for the student, the test subjects and the public.

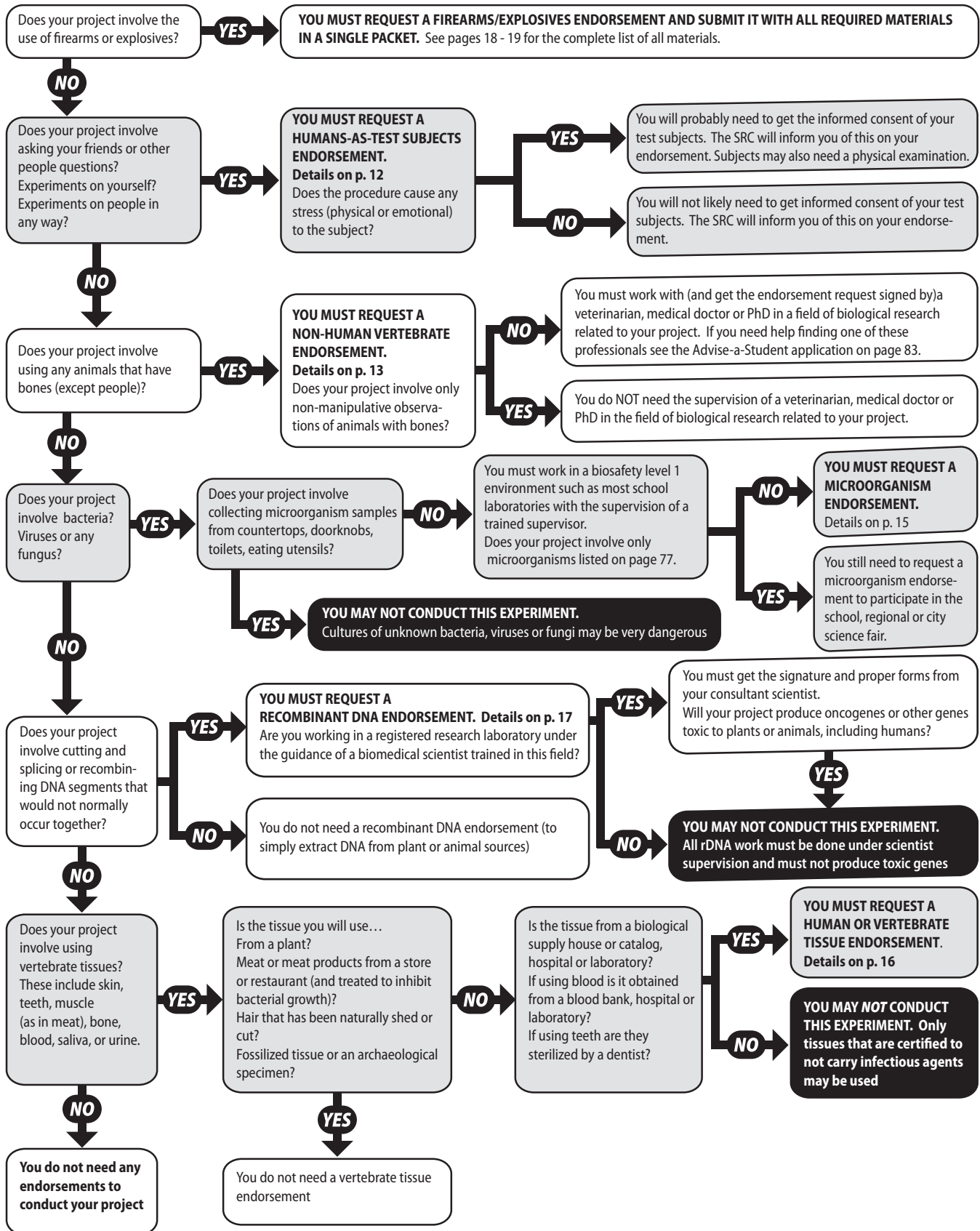
Disqualification

Projects that violate any of the rules for use of humans, vertebrates, microorganisms, recombinant DNA, human or vertebrate tissue, or firearms will be disqualified from the CPS Student Science Fair. The purpose of the endorsement process is to detect and resolve unsafe projects and rule violations BEFORE a student puts anyone at risk. ***If your project needs an endorsement and does not have one it will not be allowed to participate in Science Fair. Should an unendorsed project mistakenly progress through a school fair or Regional Network Fair, it will not be allowed to be exhibited at the City Science Fair.***



CPS Science Fair Endorsement Flow Chart

This flow chart does NOT include all the rules regarding requests for endorsements.
Read the following sections for complete details.





Safety of the Test Subjects - Use of Humans in Experimentation

Endorsement requirements

Rules and regulations exist to govern research that involves humans to ensure the rights and welfare of the individuals who participate as research subjects. **All human test subject projects, in which a variable is manipulated, including surveys, require a *Humans as Test Subjects Endorsement*.**

Observational research projects are strongly encouraged. Observational research projects are those in which the researcher 1) has no interaction with the individuals being observed, 2) does not manipulate the environment in any way and 3) does not record any personally identifiable data. No endorsement form is required for such projects.

Endorsement requests must be **received by the SRC by November 13, 2015**. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – **must be received by SRC by October 16, 2015**. Requests can be made in two ways. The endorsement requests can be accessed online at www.cssf.org, saved, printed, scanned and sent to the indicated email, or two copies of the completed typed request for endorsement form can be sent to the SRC committee member specified on the appropriate form (pages 63 - 76 of this handbook). If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary and must be displayed on board at all science fairs.

Informed Consent

In some cases, experiments that test the effect of a stressor such as exercise, loud music or personal questions about one's habits or thoughts may cause discomfort to the test subject. In such cases when the experiment causes the test subject(s) stress, discomfort or risk (physical, psychological, social, and/or legal), the student researcher must obtain the written consent of the person(s) involved. This consent means that the participant has been informed of the experimental procedure, understands the possible discomforts he/she may expect, and agrees to participate in the experiment. If the test subject is under 18 years of age, his/her legal guardian(s) must provide the informed consent, as the test subject is not of legal age to do so.

The SRC reviews all these endorsement requests to determine whether the test subjects will encounter stress. The SRC will determine whether the student researcher will need to obtain Informed Consent Certification forms from the test subjects. Notification about this will be indicated on the Humans as Test Subjects Endorsement when it is sent to the student researcher. A sample Informed Consent Certification form is found on page 65 in the Appendix. **Completed *Informed Consent Certification* forms should be kept on file with the sponsoring teacher and *not* sent to the SRC.**

Rules

1. Humans must not be subjected to treatments that are considered hazardous and/or that could result in undue stress, injury or death to the subject.
2. Projects that involve exercise and its effect on pulse, respiration rate, blood pressure, etc., of humans may be approved if a valid, normal, physical examination report of the participants being studied is on file at the school and if that exercise is not carried to the extreme.
3. Projects that involve color, texture, or any other choice are limited to preference only.
4. Quantities of food and non-alcoholic beverages are limited to normal serving amounts or less and must be consumed in a reasonable amount of time. Potential test subjects who have food allergies that may be triggered should not be tested. Normal serving amounts must be substantiated with reliable documentation. This documentation must be attached to the endorsement request form. No project may use over-the-counter drugs, prescription drugs, illegal drugs, or alcohol in order to measure the effect on a person.
5. **It is illegal to publish a report containing information that identifies the subject(s) directly or through identifiers linked to the subject(s) unless prior permission has been obtained.**



Additional requirements of the International Science and Engineering Fair

The ISEF requires that each high school must appoint an Institutional Review Board (IRB) to review and approve any proposed research involving human subjects. Students in grades 9 - 12 are highly encouraged to complete the appropriate ISEF approval forms. Approval forms and additional information about the use of humans as test subjects can be obtained from the International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs, available online: <http://www.societyforscience.org/isef/document>.

Safety of the Test Subjects - Use of Animals in Experimentation

The basic aims of experiments involving animals are to achieve an understanding of life processes and to further human knowledge. When students conduct research with animal subjects, the health and well-being of the animal subjects must be considered. Such experiments must be conducted with a respect for life and an appreciation of the humane considerations that must be afforded both vertebrates and invertebrates. Good experimental design involves using the least number of animals and causing the least sum total of distress to produce significant results of value to the scientific community.

It is strongly recommended that certain living organisms, such as plants, yeasts, protozoans, planaria, daphnia, rotifera, paramecia, earthworms, snails, insects, and other invertebrates, be used. The wide variety, ready availability, simplicity of care, and subsequent disposal of such organisms make them well suited for student study. Be aware, however, that there are hazards involved in using some microorganisms and that there are special rules governing their use. **See the Safety in Experimentation (p. 10) and Use of Microorganisms (p. 15) of this handbook for further information. The use of organisms listed on page 77 in the appendix require an endorsement.**

Observational research projects are those in which the researcher 1) has no interaction with the animals being observed, 2) does not manipulate the environment in any way and 3) is at no time responsible for the care of the animals involved. Observational research projects (observations of normal living patterns in unrestricted, public settings such as zoos, public parks, neighborhood trees, animal shelters, etc.) are strongly encouraged. **No endorsement form is required for such projects.**

Use of Non-Human Vertebrate Animals in Experimentation

Endorsement requirements

Rules and regulations exist to govern vertebrate animal research to protect the welfare of both the animal subjects and student researcher.

All vertebrate animal projects, in which a variable is manipulated, require a *Non-Human Vertebrate Animal Endorsement*. Endorsement requests must be **received by the SRC by November 13, 2015**. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – **must be received by the SCR by October 16, 2015**. Requests can be made in two ways. The endorsement requests can be accessed online at www.cssf.org, saved, printed, scanned and sent to the indicated email, or two copies of the completed typed request for endorsement form can be sent to the SRC committee member specified on the appropriate form (pages 63 - 76 of this handbook).

If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all science fairs. For some types of research, Illinois Junior Academy of Science (IJAS) approval will be required. The Scientific Review Committee will make this determination before issuing the vertebrate animal endorsement.



Rules

1. Animals should be obtained from a reputable, certified animal supplier.
2. To provide for humane treatment of animals, a qualified adult supervisor trained in the care and use of laboratory animals must assume primary responsibility for any vertebrate experiment. This person must hold either an M.D. degree, a Ph.D. degree in a field of biological research, or a D.V.M. degree. If the student does not have access to such a supervisor contact the Advise-a-Student Program for assistance in this regard. The Advise-a-Student Program Advisor Request Application is found on page 83 of this handbook.
3. Normal living conditions must be maintained for the animal's comfort. A clean, ventilated comfortable environment and continuous, uncontaminated water and food supply must be provided at all times, including during weekends and vacation periods. Animals must be maintained at a location approved by the Scientific Review Committee. A maze may be used for short periods of testing but the animal must be kept as specified above at all other times.
4. No experimental procedures that cause the animal pain or distinct discomfort or that interfere with its health shall be attempted on vertebrates. No changes may be made in an organism's environment that could result in undue stress, injury or death to the animal.
5. No intrusive or pain-producing techniques may be used. Included in intrusive techniques are surgery, injections, taking/giving blood, burning, electrical stimulation, altering a normal diet, and administering drugs or other chemical agents to measure their effect.
6. Vertebrate animals may not be killed no matter how humane the method.
7. In projects involving the incubation of bird, reptile, and amphibian embryos, the manipulated variable (experimental treatment) must be discontinued 72 hours prior to the expected hatch or birth time. Continued exposure of the manipulated variable (experimental treatment) beyond this time will result in the project being disqualified.

Additional requirements of the International Science and Engineering Fair

Students in grades 9 - 12 are highly encouraged to complete the appropriate ISEF approval forms. Approval forms and additional information can be obtained from the International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs, available online: <http://www.societyforscience.org/isef/document>.

Exceptions to Non-Human Vertebrate and Humans as Test Subjects Rules

Exceptions to the rules governing the use of nonhuman and human vertebrates will not be granted except in the circumstance that a student works with a university or research facility on a research project approved by an official review board of that institution. Approval for this exception will be granted only if the following conditions are met:

The student must seek approval for the project **before experimentation begins and must be received by November 13, 2015** of the academic year in which he/she wishes to enter the area or state exposition. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – **must be received by the SCR by October 16, 2015**. Requests for approval will not be accepted after experimentation has started.

The student must have a Request for Non-Human Vertebrate Endorsement (pages 67-68) or a Request for Humans as Test Subjects Endorsement (pages 63-65) signed by the director of the research institution indicating that the project has the approval of the local Institutional Review Board (IRB) when using humans as test subjects or the Institutional Animal Care and Use Committee (IACUC) when using vertebrate animals.

Students performing an experiment and are supervised in a university lab, research facility, or professional facility must have a letter, on the organization/research facility's letterhead, from the supervisor stating that the student worked under constant supervision and that all rules and regulations were followed. This original



letter should directly follow the required endorsement form in the student's original written paper. A copy of this letter must be displayed on the front of the display board with the other endorsement sheets.

These rules will be strictly enforced at the city and state expositions. The Chicago Public Schools Student Science Fair, Inc. is a member of IJAS and ISEF, and as such agrees to follow the rules of these organizations as well as formulating its own. High school students will need to request and complete the required ISEF forms to be considered for ISEF participation. Students should keep in mind that these approvals take time, and they should allow for this waiting period.

Safety of the Student Researcher – Use of Potentially Hazardous Biological Agents

Endorsement requirements

Rules and regulations exist to govern research that involves potentially hazardous biological agents to ensure the health and well-being of the student researcher and of the public. In most cases, projects involving microorganisms, recombinant DNA or vertebrate tissue require an endorsement. Endorsement requests **must be received by the SRC by November 13, 2015**. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – **must be received by the SCR by October 16, 2015**. Requests can be made in two ways. The endorsement requests can be accessed online at www.cssf.org, saved, printed, scanned and sent to the indicated email, or two copies of the completed typed request for endorsement form can be sent to the SRC committee member specified on the appropriate form (pages 63 - 76 of this handbook). If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all science fairs.

Students in Grades 9–12 are strongly encouraged to download and complete forms required by the International Science and Engineering Fair (ISEF) prior to experimentation. Only students who have the required forms will be considered for ISEF. These forms are NOT included in this booklet. Approval forms and additional information can be obtained from the International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs, available online: <http://www.societyforscience.org/isef/document>.

Microorganisms

Bacteria and fungi spores are all around us. Some are beneficial, some have no effect and some can be quite harmful, or pathogenic. We come in contact with them every day without becoming ill. Practicing good hygiene eliminates most of those that could invade our bodies and make us sick. A healthy immune system can defeat very small numbers of pathogenic microbes before one feels symptoms of illness.

For science experiments we prefer to work with many microbes at one time (colony) so they are more easily visible and more easily manipulated. A single visible colony is tens of thousands of bacteria. This quantity of pathogenic bacteria is quite dangerous to a person if handled incorrectly. For CPS Student Science Fair projects it is imperative that students not be exposed to any pathogenic bacteria; for this reason, reason, all projects using microorganisms must be screened by the Scientific Review Committee prior to beginning the experiment.

Rules about microorganism sources

1. *No primary or secondary cultures taken from humans or other warm-blooded animals may be used. This includes, but is not limited to, those taken directly from the skin, throat, mouth, etc. or indirectly – eating utensils, doorknobs, toilets, counter tops, etc.* Microbes taken from any of these sources cannot easily be identified as pathogenic or not. Culturing large quantities (colonies) of these wild microorganisms may produce a serious hazard to the student researcher and so this is not allowed.
2. Wild cultures of fungi (limited to types of bread mold) may be used if incubated at or below room temperature.
3. Pure cultures of microorganisms known to inhabit vertebrate animals must be supplied by a reputable, certified biological supplier. Microorganisms available to schools from such sources are generally non-pathogenic when used under proper lab conditions.



4. Projects involving viruses should be done with the help of a professional and should comply with the National Institutes of Health Guidelines unless the project is limited to a kit obtained from a legitimate supply house.
5. The guidance and assistance of a science teacher should be obtained when ordering known fungi cultures from a biological supply company.
6. Microorganisms on the list of Microorganisms for Science Projects (page 77) **require an endorsement for participation in the CPS Student Science Fair.**

Rules about experimental practices with microorganisms

7. *Sterile technique should be learned under proper guidance of a supervisor trained in this field of research before beginning any project involving microorganisms. Sterile technique is the greatest safe-guard when working with microorganisms.* Cultures of known bacteria, while they may be considered as nonpathogenic, must be treated in such a way that no bacterial contamination of the environment around the project work area can occur.
8. *All research involving potentially hazardous biological agents must be done in an appropriate laboratory (either at school or at a research facility) with a trained supervisor under Biosafety level 1 conditions;* For a complete explanation of Biosafety level 1 go to Section IV of the Center for Disease Control's Biosafety in Microbiological and Biomedical Laboratories at: http://www.cdc.gov/biosafety/publications/bmbl5/BMML5_sect_IV.pdf .
9. Only research on yeast and bread mold may be done in a student's home environment and these cultures must be incubated at or below room temperature.
10. All cultures must be destroyed by methods such as autoclaving or using a suitable 10% bleach solution before disposal.

For more information about the safe use of microorganisms go to: http://www.sciencebuddies.org/science-fair-projects/project_ideas/Micro_Safety.shtml

Human or Vertebrate Tissue

The use of human or vertebrate tissue poses a danger to the student researcher because these tissues may contain pathogenic strains of microorganisms. For the purpose of student research, all body fluids (including blood, saliva, & urine), bone, hair, and teeth, are considered tissues.

Rules about tissue sources

1. The following types of tissue do not need to be treated as potentially hazardous biological agents provided procedures are followed to inhibit bacterial growth: plant tissues; eggs, meat or meat products including bones obtained from food stores, restaurants, or packing houses; hair that has been naturally shed or clipped; fossilized tissue or archeological specimens.
2. Students using teeth in a research project must use only sterilized teeth. A written statement to this effect, from a dentist, must accompany the request for the tissue endorsement.
3. The only human blood that may be used is that which is purchased or obtained from a blood bank, hospital, or laboratory. No blood may be drawn by or from any person specifically for a science fair project.
4. Human tissue studies where the tissue samples can be identified with a specific person must have Institutional Review Board review and informed consent.

Rules about experimental practices

5. All tissue studies must be conducted under adult supervision. ISEF requires that all tissue studies be conducted under the supervision of a Designated Supervisor.
6. All human and vertebrate tissue should be handled as though it were potentially infectious. Universal precautions must be used to prevent contact with blood or other potentially infectious materials in human and animal tissues. Lab coats, gloves, and other appropriate protective items must be worn and the worksite maintained in a clean and sanitary condition.



7. Any tissue or instruments with the potential of containing blood borne pathogens (e.g., blood, blood products, tissues which would release blood when compressed, blood-contaminated instruments) must be incinerated or autoclaved after use in order to effectively destroy blood borne pathogens.

Recombinant DNA

The use of recombinant DNA techniques may pose a danger less to the student researcher than to the public at large. The practice of recombining genes, or inserting a foreign gene into a new host organism imbues it with new traits. These traits are sometimes unpredictable and potentially dangerous to the other organisms. Specific rules exist to prevent the release of the genes and altered organisms outside the lab.

Rules

1. All research involving recombinant DNA techniques must meet requirements of the National Institute of Health Guidelines for Research Involving Recombinant DNA Molecules. For more information about these guidelines see:
http://osp.od.nih.gov/sites/default/files/Synthetic_FAQs_April_2013.pdf
Guidelines for steps involved for approved research are in the following link:
http://www.cdc.gov/biosafety/publications/bmbl5/BMML5_appendixJ.pdf
2. The study must only be conducted in a registered research laboratory under the guidance of a biomedical scientist, approved by an appropriately constituted and registered biosafety committee to conduct such work.
3. The study must have the approval of a biomedical scientist or the laboratory's IBC when necessary.
4. Propagation of recombinants containing DNA coding for oncogenes or other human, plant or animal toxins (including viruses) are prohibited.

Safety of the Student Researcher – Use of Hazardous Equipment

Safety is the watchword when developing a science fair project. Without exception, the highest standards of safety are required. All projects should be conducted with proper adult supervision. The following are safety measures of particular importance but do not require the approval of the Scientific Review Committee before you may conduct your experiment; with the exception of conducting a demonstration or experiment using firearms or explosives, and the production of alcohol, which will require prior approval from the Scientific Review Committee and/or Safety Review Committee before you begin your project.

Chemical Hazards

Any chemical can be dangerous when used improperly. Refer to the Merck Index and/or The Handbook of Chemistry and Physics <http://www.chemnetbase.com/> to determine potential hazards of any chemicals that are to be studied. Refer to the Materials Safety Data Sheet (MSDS) for additional safety information. <http://www.flinnsci.com/msds-search.aspx>

- Students should always wear eye protection when working with any chemical.
- All chemicals must be disposed of in accordance with State and Federal Environmental Rules <http://www.epa.gov/chemfact/>
- If possible, the student should work under the supervision of a responsible chemist.

Drone Hazards

Drones may be used in a science project PROVIDED the use complies with all Federal, State and community rules, regulations and ordinances. In addition, the use of a drone for a science project may not infringe on anyone's privacy or air space.

Electrical Hazards

All electrical equipment must be constructed according to standard electrical safety codes. If there is doubt, consult with an electric shop teacher or an electrician. The city of Chicago's electrical code for public exhibits requires all electrical devices connected to the circuits within the building to be grounded using type SO three-wire conductors.



All wiring, switches, and metal parts carrying current must be completely enclosed by barriers on all sides to absolutely prevent observers from reaching into the mechanism where they might receive an electrical shock.

Doorbell push buttons must not be used to control 110 volt apparatus. Use toggle or push-button switches designed for proper load. Non-insulated switches, such as knife switches, will not be permitted. All electrical joints must be properly secured and insulated. All electrical joints must be permanent and soldered.

Federal Communications Commission (FCC) regulations are specific with regard to spark-discharge equipment. If equipment containing such devices is used, the machine must be operated so that it does not cause harmful interference to normal channels of communication.

Fire Hazards

Open flames, torches, burners, and electrical units should be used only with proper adult supervision and safety equipment.

Firearms and Explosive Hazards

- A. The provisions of this section shall not apply to model rocketry, provided any demonstration or experiment involving a model rocket is supervised by a parent, guardian or teacher over 21 years of age and all local, municipal, state and federal laws are strictly adhered to at all times concerning any model pocket, rocket engine or accessory.
- B. For purposes of participating in programs sponsored by the Chicago Public Schools Student Science Fair, Inc., experiments or demonstrations involving: 1) the use of explosives of any type whatsoever (including, but not limited to black powder and gunpowder); or 2) the use of any air gun, firearm or black powder gun, is absolutely forbidden except when advance permission is obtained from the Chicago Public Schools Student Science Fair, Inc. to utilize an air gun or firearm only as stated in this paragraph below. Notwithstanding the prohibition set forth above, a student may make application to the Chicago Public Schools Student Science Fair, Inc. for advance permission to conduct a demonstration or an experiment utilizing an air gun or firearm only. The Chicago Public Schools Student Science Fair, Inc. may, at its sole discretion, deny permission if it has any concern whatsoever for safety related to the demonstration or experiment. Additionally, an experiment will be approved only if all of the following conditions are met at all times.
 1. The student may not possess, handle or utilize any air gun or firearm at any time for conducting the demonstration or experiment for a science fair project; and the student and all bystanders, if present during the demonstration or experiment, must be behind a ballistic shield and wear eye and ear protection; the student is responsible for all items listed on the Checklist of the Physical Arrangement of the Science Project Paper on pages 57 and 58 of the 2015 Science Fair Handbook.
 2. The air gun or firearm must be handled at all times and the demonstration or experiment must be directly conducted at all times by a person over 21 years of age who is certified as a police officer by the Illinois Law Enforcement Training and Standards Board or by a person himself or herself licensed as a Private Detective or Private Security Contractor and in possession of a currently valid Firearms Control Card issued by the Illinois Department of Financial and Professional Regulation ("IDFPR") (Note: a Concealed Carry License issued by the Illinois State Police SHALL NOT SUFFICE, and a Permanent Employee Record Card "PERC" issued by the IDFPR SHALL NOT SUFFICE).
 3. The police officer or IDFPR-licensed professional conducting and supervising the demonstration or experiment must provide a written statement describing the demonstration or experiment in detail, provide a copy of all of his or her credentials, and certify under the police officer's or IDFPR-licensed professional's signature that the demonstration or experiment is safe to all persons involved; and explain why and how the demonstration or experiment is safe to all persons involved to the satisfaction of Chicago Public Schools Student Science Fair, Inc.
 4. The police officer or IDFPR-licensed professional supervising the demonstration or experiment must provide a Certificate of Liability Insurance in the amount of no less than \$1,000,000.00 naming the Chicago Public Schools Student Science Fair, Inc. as "ADDITIONAL INSURED"; the facility where the demonstration or experimentation will be conducted must be recognized by the Illinois State Police and will be required to provide a Certificate of Liability Insurance in the amount of \$1,000,000.00 naming the Chicago Public Schools Student



Science Fair, Inc., as “ADDITIONAL INSURED”.

5. The student, parent, guardian, police or professional supervisor, and all persons present during the conduct of the demonstration or experiment must provide a release of liability for the benefit of, and in a form agreeable to, the Chicago Public Schools Student Science Fair, Inc., such form shall be provided when the student is granted permission to conduct the demonstration or experiment.
6. The demonstration or experiment must not involve the hand loading or reloading of ammunition and may not utilize any black powder or muzzle loading gun.
7. Any demonstration or experiment involving a firearm must utilize at all times commercially-loaded fixed cartridge ammunition manufactured according to SAAMI standards.
8. The air gun or firearm utilized must be commercially-manufactured and may not be older than fifty (50) years of age.
9. The demonstration or experiment shall not involve making or testing modifications or alterations to the air gun or firearm itself.
10. All local, municipal, state and federal laws and regulations must be strictly adhered to at all times.
11. No air guns, firearms or ammunition can be present at any level of science fair (school science fair, Network Regional Science Fair, City Science Fair, IJAS and ISEF).

Any advance permission issued shall be valid to conduct experiments or demonstrations for a period of thirty (30) days following approval, after which further experiments or demonstrations may not be conducted unless the advance permission is renewed or separate advance permission for a new or different demonstration or experiment is given.

Make sure your Request for Use of Firearms Endorsement application is filed as soon as possible to allow enough time for the Safety Review Committee to review and process it. No demonstrations or experiment using firearms or explosives can begin without prior approval from the Safety Review Committee.

Glassware Hazards

Care should be taken when using glassware. Broken glass should be disposed of in proper containers. Whenever possible, plastic lab ware should be substituted for glass.

Hazardous Materials

Explosive, flammable, corrosive, or highly poisonous substances should be used with proper adult supervision and safety equipment. Examples of such substances are gasoline, alcohol, lighter fluids, armed rockets, cylinders of compressed gas, aerosol cans, and automobile storage batteries containing sulfuric acid.

Laser Hazards

Any laser used in an experimental or design project must be no greater than Class 2 (visible-light continuous wave lasers under 1 mW such as red laser pointers) without special registration from the State of Illinois (see below). In general the lowest class laser possible should be used for a given project. The revised laser classification system along with associated hazards and safety precautions are reviewed at

http://en.wikipedia.org/wiki/Laser_safety. Each experiment using lasers should clearly state the safety precautions taken. Under special circumstances, where the use of such a laser is absolutely critical to the success of a project, Class 3R lasers (also labeled as Class 3A for older lasers) may be used. These lasers require written documentation of registration from the State of Illinois and need to follow all applicable safety precautions required by the State (<http://www.illinois.gov/iema/NRS/RadSafety/Pages/Laser.aspx>). The scientific justification for using a 3R / 3A laser must be explained, and incorporation of these extra safety precautions must be written into the experimental procedures. Among other practices, we require that 3A lasers use a protective housing or barricade which, when in place, prevents human access to the beam during operation. Under no circumstances may lasers above Class 3R /



3A be used in any project.

Mechanical Hazards

Materials and construction must be durable. All parts must be firmly attached. Power-driven parts must be protected with guards.

Production of Alcohol

Under current law and regulations, you cannot conduct experiments involving distillation of alcohol at your home. As an alternative, Federal Law requires a permit for an alcohol fuel plant, or AFP. Under this type of permit, experiments with alcohol fuels can be conducted at locations properly qualified with the Bureau of Alcohol, Tobacco, Firearms, and Explosives ATF. Approval for this type of project requires the following:

- An authorized representative of your school (a teacher or other school official) must complete and forward an application form 5110.74 to the ATF to establish a small AFP at your school.
- The experiment must be conducted at your school under appropriate adult supervision
- The school official must tell ATF how long the experiment will last. They may allow for additional time in case your experiment is selected for additional competition or display at an area, or the City Science Fair.
- The school official must describe the adult supervision that will be provided. This is required because of concern about the safety of students handling hazardous materials and using distillation equipment with alcohol--even with adult supervision.

Students who produce alcohol in connection with a science fair project must obtain permission from the Scientific Review Committee (SRC) prior to beginning the investigation.

Make sure your application is filed as soon as possible to allow enough time for ATF to process it. You cannot begin the experiment until ATF issues you a permit.

Application form 5110.74 and additional information are available from the Bureau of Alcohol, Tobacco, Firearms, and Explosives, National Revenue Center, Spirits Unit A, 550 Main Street, Room 8002, Cincinnati, OH 45202-3263, 1-800-398-2282 or (513) 684-7150, natirevctr@cinc.atf.treas.gov.

A copy of your permit must be attached with your Safety Sheet on the front of your display board and with each copy of your Research Summary.

Radiation Hazards

Projects dealing with radiation from cathode rays, X-rays, or radioactive materials must present no hazard to the public or the student exhibitor.

Ultraviolet Light Sources/Radiation

Students using ultraviolet light sources must be adequately shielded from these sources. Many experiments using these sources should not be undertaken unless under the direct supervision of an adult familiar with the equipment and hazards involved. No student may work with any radioactive materials unless the work is conducted in a licensed laboratory under the direct supervision of a licensed individual.



Resources for more information on safety in experimentation

Humans as Test Subjects

Code of Federal Regulation (CFR), Title 45 (Public Welfare), Part 46- Protection of Human Subjects (45CFR46)

<http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm>

Penslar, R.L., *Institutional Review Board (IRB) Guidebook*. (1993). Washington, DC: ORRP-NIH

http://www.hhs.gov/ohrp/archive/irb/irb_guidebook.htm

Animals as Test Subjects

Federal Animal Welfare Act (AWA)

7 U.S.C.2131-2157 Subchapter A – Animal Welfare (Parts I, II, III)

<http://www.nal.usda.gov/awic/legislat/awicregs.htm>

The Guide for the Care and Use of Laboratory Animals, Institute of Laboratory Animal Research (ILAR), Commission on Life Sciences, National Research.

<http://www.grants.nih.gov/grants/olaw/olaw.htm>

John's Hopkins Center for Alternatives to Animal Testing (CAAT)

<http://caat.jhsph.edu/>

Biosafety Hazards

Biosafety in Microbiological and Biomedical Laboratories (BMBL) – 5th Edition

Published by CDC-NIH

<http://www.cdc.gov/biosafety/publications/bmbl5/>

Microorganisms for Education

The College of William and Mary – Department of Biology

<http://www.science-projects.com/safemicrobes.htm>

NIH Guidelines for Research Involving Recombinant DNA Molecules

Published by National Institutes of Health

http://osp.od.nih.gov/sites/default/files/NIH_Guidelines_0.pdf \

http://osp.od.nih.gov/sites/default/files/Synthetic_FAQs_April_2013.pdf

Guidelines for steps involved for approved research are in the following link:

http://www.cdc.gov/biosafety/publications/bmbl5/BMBL5_appendixJ.pdf

General Lab Safety

Centers for Disease Control and Prevention

Guidelines for Biosafety Laboratory Competency

<http://www.cdc.gov/mmwr/pdf/other/su6002.pdf>

Centers for Disease Control and Prevention

School Chemistry Laboratory Safety Guide

<http://www.cdc.gov/niosh/docs/2007-107/pdfs/2007-107.pdf>

Safety in Academic Chemistry Laboratories, volumes 1 and 2, 2003.

To order a copy of these or other Safety publications from ACS, please contact the Office of Society Services at 1-800-227-5558 or help@acs.org.

Material Safety and Data Sheets (MSDS)

<http://www.flinnsci.com/msds-search>

Drug Enforcement Agency list of controlled substances

<http://www.deadiversion.usdoj.gov/schedules/index.html>



Bureau of Alcohol, Tobacco, Firearms and Explosives
<http://www.atf.gov>

Occupational Safety and Health Administration Documents www.osha.gov
Search for: STD 01-05-001 - Guidelines for Laser Safety and Hazard Assessment

Sources for Animal Tissue and Microorganism Cultures

Carolina Biological Supply Company
Phone: (800) 335-5551
Website: <http://www.carolina.com>

American Type Culture Collection
Phone: (703) 365-2700 or (800) 638-6597
Website: <http://www.atcc.org>

Firearms and Explosive Hazards

National Rifle Association of America, 11250 Waples Mill Road, Fairfax, VA 22030
1-800-392-8683, training.nra.org/nra-gun-safety-rules.aspx

National Shooting Sports Foundation, Flintlock Office Center, 11 Mile Hill Road Newton, CT 06470-2359
Phone (203) 426-1087, FAX (203) 426-1087, www.nssf.org/safety/basics/

Smith & Wesson, 2100 Roosevelt Avenue, Springfield, MA 01104
Phone 1-800-331-0852, Fax 1-413-747-3317, E-mail <https://www.smith-wesson.com>

https://www.smith-wesson.com/.../Category4_750001_750051_757990_-1_7579

Wikipedia, the Free Encyclopedia, Gun Laws in Illinois, en.wikipedia.org/wiki/Gun_laws_in_Illinois dd
to end of resources: