

# AERSF JR/SR CATEGORIES

## Animal Sciences (ANIM)

- Animal Behavior
- Cellular Studies
- Development
- Ecology
- Genetics
- Nutrition & Growth
- Physiology
- Systematics & Evolution
- Agricultural Animal Science

## Behavioral and Social Sciences (BEHA)

- Clinical & Development
- Psychology
- Cognitive Psychology
- Physiological Psychology
- Social & Social Psychology
- Human Behavior Studies

## Biochemistry (BCHM)

- Analytical Biochemistry
- General Biochemistry
- Structural Biochemistry

## Biomedical/Bio-Informatics & Health Sciences (BMED)

- Disease study
- Drug Development
- Epidemiology
- Nutrition
- Biomedical Engineering
- Computational Pharmacology
- Computational Bio-modeling
- Computational Biology
- Computer Neuroscience
- Genomics & Genetics

## Cellular and Molecular Biology (CELL)

- Cell Physiology
- Genetics
- Immunology
- Molecular Biology
- Neurobiology

## Chemistry (CHEM)

- Analytical Chemistry
- Computational Chemistry
- Organic/Inorganic chemistry
- Chemical Engineering

## Computer Science: Hardware/Embedded Systems

### (CSHW)

- System Hardware
- Circuits
- Internet of Things
- Microcontrollers
- Networking/Communications
- Optics/Sensors/Signal Processing

## Computer Science: Systems Software

### (CSSW)

- Algorithms
- Cybersecurity
- Databases
- Operating System
- Programming Languages
- Software performance
- Neural Networks
- Gaming

## Earth and Environmental Sciences

### (EAEV)

- Atmospheric Science
- Climate Science
- Environmental Science
- Environmental Management
- Environmental Engineering
- Geosciences
- Water Science
- Soil Science

## Energy: Traditional/Alternative/Energy Efficiency (ETAE)

- Energy Efficiency
- Alternative Energy
- Renewable Energy
- Traditional Energy
- Alternative Fuels
- Solar Energy
- Thermal
- Wind
- Fuel Cells & Batteries etc.

## Engineering Mechanics(ENGM)

- Physical Engineering
- Mechanical Engineering
- Aerospace Engineering
- Civil Engineering
- Transportation Engineering
- Electrical Engineering
- Structural Engineering

## Materials Science (MATS)

- Materials
- Biomaterials
- Ceramic & Glasses
- Composite Materials
- Materials Computation & Theory
- Nanomaterials
- Polymers

## Mathematics (MATH)

- Mathematical Sciences
- Analysis
- Graph Theory
- Geometry
- Number Theory
- Probability & Statistics

## Microbiology (MCRO)

- Antimicrobials & Antibiotics
- Applied Microbiology
- Bacteriology
- Virology
- Microbial Genetics
- Environmental Microbiology
- Other

## Physics and Astronomy (PHYS)

- Astronomy & Cosmology
- Astro Physics
- Mechanics
- Nuclear, Plasma & Particle Physics
- Electromagnetics
- Optical
- Quantum Physics
- Theoretical Physics

## Plant Sciences (PLNT)

- Agronomy
- Ecology
- Genetics/Breeding
- Growth & Development
- Pathology
- Physiology
- Systematics & Evolution

## Robotics and Intelligent Machines

### (ROBO)

- Biomechanics
- Cognitive Systems
- Control Theory
- Machine Learning
- Robot Kinematics
- Integrated Sensors
- Navigation



Austin Energy Regional Science Festival  
Austin Energy Regional Science Festival

Please note that these rules are in addition to the INTEL ISEF rules presented in this book:

1. **Middle school students** (Jr. Division) are **NOT** allowed to perform any research or submit any projects in which the student him/herself has designed or utilized potato guns, firearms, or any type of explosive projectile or air canister devices. High school students (Sr. Division) are only allowed to conduct these types of projects under proper adult supervision when they have exactly followed the ISEF rules found in this rule book, the "Intel ISEF International Rules & Guidelines".

# **Intel International Science and Engineering Fair**



## **International Rules and Guidelines 2017**

# International Rules for Pre-college Science Research: Guidelines for Science and Engineering Fairs 2016–2017

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The International Rules and Guidelines for Science Fairs is available at [student.societyforscience.org/intel-isef](http://student.societyforscience.org/intel-isef) in multiple formats. Familiarity with the rules is critical for students, parents, teachers, mentors, fair directors and local and affiliated fair scientific review committees (SRC) and institutional review boards (IRB).

- International Rules and Guidelines – The full text of the International Rules and forms in html and as a downloadable pdf.
- The Intel ISEF Rules Wizard – An interactive tool which asks questions about your intended project and provides a list of forms required.
- Common SRC Problems – Frequent problems that emerge during Scientific Review Committee review for qualification at the Intel ISEF. Read these to learn what NOT to do.

These Rules are applicable for:

**The Intel International Science and Engineering Fair 2017  
Los Angeles, CA, USA, May 14–19, 2017**

The purpose of these rules is to:

- protect the rights and welfare of the student researcher
- protect the rights and welfare of human participants
- protect the health and welfare of vertebrate animal subjects
- ensure adherence to federal regulations
- ensure use of safe laboratory practices
- protect the environment
- determine eligibility for competition in the Intel ISEF

For pre-review and approval of your project, find your fair at  
<http://apps2.societyforscience.org/ssp-affiliate-fair/>

For Intel ISEF questions, contact:  
Society for Science & the Public  
Science Education Programs  
1719 N Street, NW, Washington, DC 20036  
office: 202-785-2255, fax: 202-785-1243  
email: [sciedu@societyforscience.org](mailto:sciedu@societyforscience.org)

**For rules questions, contact the Intel ISEF Scientific Review Committee:  
[SRC@societyforscience.org](mailto:SRC@societyforscience.org)**

# ALL PROJECTS

## Ethics Statement

Scientific fraud and misconduct are not condoned at any level of research or competition. This includes plagiarism, forgery, use or presentation of other researcher's work as one's own and fabrication of data. Fraudulent projects will fail to qualify for competition in affiliated fairs and the Intel ISEF. Society for Science & the Public reserves the right to revoke recognition of a project subsequently found to have been fraudulent.

## Eligibility/Limitations

1. Each Intel ISEF-affiliated fair may send the number of projects provided by their affiliation agreement.
2. A student must be selected by an Intel ISEF-affiliated fair, and:
  - a. be in grades 9–12 or equivalent;
  - b. not have reached age 20 on or before May 1 preceding the Intel ISEF.
3. English is the official language of the Intel ISEF. Student project boards and abstracts must be in English.
4. Each student is only allowed to enter one project. That project may include no more than 12 months of continuous research and may not include research performed before January 2016.
5. Team projects must have no more than three members. Teams competing at Intel ISEF must be composed of members who all meet Intel ISEF eligibility.
6. Students may compete in only one Intel ISEF affiliated fair, except when proceeding to a state/national fair affiliated with the Intel ISEF from an affiliated regional fair.
7. Projects that are demonstrations, 'library' research or informational projects, 'explanation' models or kit building are not appropriate for the Intel ISEF.
8. All sciences (physical, life, social) are represented at the Intel ISEF. Review a [complete list of categories and sub-categories with definitions](#).
9. A research project may be a part of a larger study performed by professional scientists, but the project presented by the student must be only their own portion of the complete study.

## Requirements

### General

1. All domestic and international students competing in an Intel ISEF-affiliated fair must adhere to all rules as set forth in this document.
2. All projects must adhere to the Ethics Statement above.
3. It is the responsibility of the student and the Adult Sponsor to evaluate the study to determine if the research will require forms and/or review and approval prior to experimentation, especially projects that include human participants, vertebrate animals, or potentially hazardous biological agents.

4. Projects must adhere to local, state and U.S. Federal laws, regulations and permitting conditions. In addition, projects conducted outside the U.S. must also adhere to the laws of the country and jurisdiction in which the project was performed.
5. The use of non-animal research methods and alternatives to animal research are strongly encouraged and must be explored before conducting a vertebrate animal project.
6. Introduction or disposal of non-native and/or invasive species (e.g. insects, plants, invertebrates, vertebrates), pathogens, toxic chemicals or foreign substances into the environment is prohibited. It is recommended that students reference their local, state or national regulations and quarantine lists.
7. Intel ISEF exhibits must adhere to Intel ISEF [display and safety requirements](#).
8. All projects must adhere to the requirements of the affiliated fair(s) in which it competes to qualify for participation in the Intel ISEF. Affiliated fairs may have additional restrictions or requirements. Knowledge of these requirements is the responsibility of the student and Adult Sponsor.

## Approval and Documentation

9. Before experimentation begins, a local or regional Institutional Review Board (IRB) or Scientific Review Committee (SRC) associated with the Intel ISEF-affiliated fair must review and approve most projects involving human participants, vertebrate animals, and potentially hazardous biological agents. **Note: If a project involves the testing of a student designed invention, prototype or concept by a human, an IRB review and approval may be required prior to experimentation. See Human Participants Rules for details.**
10. Every student must complete the [Student Checklist \(1A\)](#), a [Research Plan/Project Summary](#) and [Approval Form \(1B\)](#) and review the project with the Adult Sponsor in coordination with completion by the Adult Sponsor of the [Checklist for Adult Sponsor \(1\)](#).
11. A [Qualified Scientist](#) is required for all studies involving Biosafety Lab-2 (BSL-2) potentially hazardous biological agents and DEA-controlled substances and is also required for many human participant studies and many vertebrate animal studies.
12. After initial IRB/SRC approval (if required), any proposed changes in the [Student Checklist \(1A\)](#) and Research Plan/Project Summary must be re-approved before laboratory experimentation/data collection resumes.
13. Projects which are continuations of a previous year's work and which require IRB/SRC approval must undergo the review process with the current year proposal prior to experimentation/data collection for the current year.
14. Any continuing project must document that the additional research is new and different. ([Continuation Projects Form \(7\)](#)).

15. If work was conducted in a regulated research institution, industrial setting or any work site other than home, school or field at any time during the current Intel ISEF project year, the [Regulated Research Institutional/Industrial Setting Form \(1C\)](#) must be completed and displayed at the project booth.
16. After experimentation, each student or team must submit a (maximum) 250-word, one-page abstract which summarizes the current year's work. The abstract must describe research conducted by the student, not by the supervising adult(s).
17. A project data book and research paper are not required, but are strongly recommended for judging purposes. Regional or local fairs may require a project data book and/or a research paper.
18. All signed forms, certifications, and permits must be available for review by all regional, state, national and international affiliated fair SRCs in which the student(s) participate. This review must occur after experimentation and before competition.

### Continuation/Research Progression of Projects

1. As in the professional world, research projects may build on work performed previously. A valid continuation project is a sound scientific endeavor. Students will be judged only on laboratory experiment/data collection performed over 12 continuous months beginning no earlier than January 2016 and ending May 2017.
2. Any project based on the student's prior research could be considered a continuation/research progression project. These projects must document that the additional research is a substantive expansion from prior work (e.g. testing a new variable or new line of investigation). Repetition of previous experimentation with the same methodology and research question, even with an increased sample size, is an example of an unacceptable continuation.
3. The display board and abstract must reflect the current year's work only. The project title displayed in the finalist's booth may mention years (for example, "Year Two of an Ongoing Study"). Previous year's databooks, research papers and supporting documents may be at the booth, but not openly displayed, if properly labeled as such.
4. Longitudinal studies are permitted as an acceptable continuation under the following conditions:
  - a. The study is a multi-year study testing or documenting the same variables in which time is a critical variable. (Examples: Effect of high rain or drought on soil in a given basin, return of flora and fauna in a burned area over time.)
  - b. Each consecutive year must demonstrate time-based change.
  - c. The display board must be based on collective past conclusionary data and its comparison to the current year data set. No raw data from previous years may be displayed.
5. All projects must be reviewed and approved each year and forms must be completed for the new year.

6. NOTE: For competition in the Intel ISEF, the [Continuation/Research Progression Project Form \(7\)](#) is required for projects in the same field of study as a previous project. This form must be displayed at the project booth. Retention of all prior years' paperwork is required and must be presented to the Intel ISEF SRC upon request.

### Team Projects

1. Team projects compete and are judged in the scientific category of their research at the Intel ISEF. All team members must meet the eligibility requirements for Intel ISEF.
2. Teams must have no more than three members. A team with members from different geographic regions may compete at an affiliated fair of one of its members, but not at multiple fairs. However, each affiliated fair holds the authority to determine whether teams with members outside of a fair's geographic territory are eligible to compete, understanding that if the team wins the right to attend Intel ISEF, all team members' expenses must be supported by the fair.
  - a. Team membership cannot be changed during a given research year unless there are extenuating circumstances and the local SRC reviews and approves the change, including converting a team project to an individual project or vice versa. Such conversions must address rationale for the change and include a clear delineation between research preceding the change and that which will follow. A memorandum documenting this review and approval should be attached to Form 1A.
  - b. Once a project has competed in a science fair at any level, team membership cannot change and the project cannot be converted from an individual project to a team project or vice versa.
  - c. In a future year, any project may be converted from an individual to a team project, from a team to an individual project and/or have a change in team membership.
3. Each team is encouraged to appoint a team leader to coordinate the work and act as spokesperson. However, each member of the team should be able to serve as spokesperson, be fully involved with the project, and be familiar with all aspects of the project. The final work should reflect the coordinated efforts of all team members and will be evaluated using the same judging criteria as individual projects.
4. Each team member must submit an Approval Form (1B). Team members must jointly submit the Checklist for Adult Sponsor (1), one abstract, a Student Checklist (1A), a Research Plan/Project Summary and other required forms.
5. Full names of all team members must appear on the abstract and forms.

Contact the [Science Education Programs](#) or the [Scientific Review Committee](#) with questions.































# Potentially Hazardous Biological Agents Risk Assessment

Use this information to complete PHBA Risk Assessment Form (6A)

Risk assessment defines the potential level of harm, injury or disease to plants, animals and humans that may occur when working with biological agents. The end result of a risk assessment is the assignment of a biosafety level which then determines the laboratory facilities, equipment, training, and supervision required.

Risk assessment involves:

1. Assignment of the biological agent to a risk group
2. Studies involving a known microorganism must begin with an initial assignment of the microorganism to a biosafety level risk group based on information available through a literature search.
3. The study of unknown microorganisms and the use of fresh tissues relies on the expertise of the supervising adult(s).
4. Determination of the level of biological containment available to the student researcher to conduct the experimentation. (See "Levels of Biological Containment" for details.)
5. Assessment of the experience and expertise of the adult(s) supervising the student.
6. Assignment of a biosafety level for the study based on risk group of biological agent, level of biological containment available and the expertise of the Qualified Scientist or Designated Supervisor who will be supervising the project
7. Documentation of review and approval of study prior to experimentation:
  - a. If a study is conducted at a non-regulated site (e.g. school), the SRC reviews the Research Plan/Project Summary.
  - b. If the study was conducted at a Regulated Research Institution, and was approved by the appropriate institutional board (e.g. IBC, IACUC), the SRC reviews the institutional forms provided and documents SRC approval (Form(6A)).
  - c. If a PHBA study was conducted at a Regulated Research Institution but the institution does not require review for this type of study. The SRC must review the study and document approval on Form 6A that the student received appropriate training and the project complies with Intel ISEF rules.

## Classification of Biological Agents Risk Groups

Biological agents, plant or animal, are classified according to biosafety level risk groups. These classifications presume ordinary circumstances in the research laboratory, or growth of agents in small volumes for diagnostic and experimental purposes.

**BSL-1** risk group contains biological agents that pose low risk to personnel and the environment. These agents are highly unlikely to cause disease in healthy laboratory workers, animals or plants. The agents require Biosafety Level 1 containment. Examples of BSL-1 organisms are: *Agrobacterium tumefaciens*, *Micrococcus leuteus*, *Neurospora crassa*, *Bacillus subtilis*.

**BSL-2** risk group contains biological agents that pose moderate risk to personnel and the environment. If exposure occurs in a laboratory situation, the risk of spread is limited and it rarely would cause infection that would lead to serious disease. Effective treatment and preventive measures are available in the event that an infection occurs. The agents require Biosafety Level 2 containment. Examples of BSL-2 organisms are: *Mycobacterium*, *Streptococcus pneumoniae*, *Salmonella choleraesuis*.

**BSL-3** risk group contains biological agents that usually cause serious disease (human, animal or plant) or that can result in serious economic consequences. Projects in the BSL-3 group are prohibited.

**BSL-4** risk group contains biological agents that usually produce very serious disease (human, animal or plant) that is often untreatable. Projects in the BSL-4 group are prohibited.

## Levels of Biological Containment

There are four levels of biological containment (Biosafety Level 1–4). Each level has guidelines for laboratory facilities, safety equipment and laboratory practices and techniques.

**BSL-1** containment is normally found in water-testing laboratories, in high schools, and in colleges teaching introductory microbiology classes. Work is done on an open bench or in an appropriate biosafety hood. Standard microbiological practices are used when working in the laboratory. Decontamination can be achieved by treating with chemical disinfectants or by steam autoclaving. Lab coats and gloves are required. The laboratory work is supervised by an individual with general training in microbiology or a related science.

**BSL-2** containment is designed to maximize safety when working with agents of moderate risk to humans and the environment. Access to the laboratory is restricted. Biological safety cabinets (Class 2, type A, BSC) must be available. An autoclave should be readily available for decontaminating waste materials. Lab coats and gloves are required; eye protection and face shields must also be worn as needed. The laboratory work must be supervised by a scientist who understands the risk associated with working with the agents involved.

**BSL-3** containment is required for infectious agents that may cause serious or potentially lethal diseases as a result of exposure by inhalation. Projects in the BSL-3 group are prohibited.

**BSL-4** containment is required for dangerous/exotic agents that pose high risk of life-threatening disease. Projects in the BSL-4 group are prohibited.

# Hazardous Chemicals, Activities or Devices Rules

Includes DEA-controlled substances, prescription drugs, alcohol & tobacco, firearms and explosives, radiation, lasers, etc.

The following rules apply to research using hazardous chemicals, devices and activities. These include substances and devices that are regulated by local, state, country, or international law, most often with restrictions of their use by minors such as DEA-controlled substances, prescription drugs, alcohol, tobacco, firearms and explosives. Hazardous activities are those that involve a level of risk above and beyond that encountered in the student's everyday life.

These rules are intended to protect the student researcher by ensuring proper supervision and the consideration of all potential risks so that the appropriate safety precautions are taken. Students are required to meet all standards imposed by Intel ISEF, school, local, and/or regional fair(s).

## Rules for ALL Projects Involving Hazardous Chemicals, Activities and Devices

1. The use of hazardous chemicals and devices and involvement in hazardous activities require direct supervision by a Designated Supervisor, except those involving DEA-controlled substances, which require supervision by a Qualified Scientist.
2. The student researcher must conduct a risk assessment in collaboration with a Designated Supervisor or Qualified Scientist prior to experimentation. This risk assessment is documented on the Risk Assessment Form 3.
3. Student researchers must acquire and use regulated substances in accordance with all local, state, U.S. federal and country laws. For further information or classification for these laws and regulations, contact the appropriate regulatory agencies.
4. For all chemicals, devices or activities requiring a Federal and/or State Permit, the student/supervisor must obtain the permit prior to the onset of experimentation. A copy of the permit must be available for review by adults supervising the project and the local, affiliated, and Intel ISEF SRCs in their review prior to competition.
5. The student researcher must minimize the impact of an experiment on the environment. Examples include using minimal quantities of chemicals that will require subsequent disposal; ensuring that all disposal is done in an environmentally safe manner and in accordance with good laboratory practices.
6. The following forms are required:
  - a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/Project Summary and Approval Form (1B)
  - b. Regulated Research Institution Form (1C), when applicable
  - c. Qualified Scientist Form (2), when applicable
  - d. Risk Assessment Form (3)

## Additional Rules for Specific Regulated Substances

There are additional rules for the following regulated substances:

- DEA-controlled Substances
- Prescription Drugs
- Alcohol & Tobacco
- Firearms and Explosives
- Drones

### 1. DEA-Controlled Substances

The U.S. Drug Enforcement Administration (DEA) regulates chemicals that can be diverted from their intended use to make illegal drugs. Other countries may have similar regulatory bodies; students outside of the U.S. must adhere to their own country's drug regulatory agency requirements in addition to U.S. DEA regulations. DEA-controlled substances and their schedule number are at the DEA website under Sources of Information. It is the responsibility of the student to consult this list if there is a possibility that substances used in experimentation could be regulated.

- a. All studies using DEA-controlled substances must be supervised by a Qualified Scientist who is licensed by the DEA (or other international regulatory body) for use of the controlled substance.
- b. All studies using DEA Schedule 1 substances (including marijuana) must have the research protocol approved by DEA before research begins. Schedule 2, 3 and 4 substances do not require protocol approval by DEA.

### 2. Prescription Drugs

Prescription drugs are drugs regulated by federal or country laws to protect against inappropriate or unsafe use. Special precautions must be taken in their use for a science project as follows:

- a. Students are prohibited from administering prescription drugs to human participants.
- b. A veterinarian must supervise student administration of any prescription drugs to vertebrate animals.

### 3. Alcohol and Tobacco

The U.S. Alcohol and Tobacco Tax and Trade Bureau (TTB) regulates the production of alcohol and distribution of alcohol and tobacco products. Many such products are restricted by age for purchase, possession and consumption.

- a. Fermentation studies in which minute quantities of ethyl alcohol are produced are permitted.
- b. The Designated Supervisor is responsible for the acquisition, usage and appropriate disposal of the alcohol or tobacco used in the study.
- c. Production of wine or beer by adults is allowable in the home and must meet TTB home production regulations. Students are allowed to design and conduct a research project, under direct parental supervision, involving the legal production of the wine or beer.
- d. Students are prohibited from conducting experiments where consumable ethyl alcohol is produced by distillation. However, students are allowed to distill alcohol for fuel or other non-consumable products. To do so, the work must be conducted at school or a Regulated Research Institution and follow all local and country laws. See Alcohol and Tobacco Tax and Trade Bureau (TTB) website for details.

### 4. Firearms and Explosives

The U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), along with state agencies, regulates the purchase and use of firearms and explosives. A firearm is defined as a small arms weapon from which a projectile is fired by gunpowder. An explosive is any chemical compound, mixture or device, the primary purpose of which is to function by explosion. Explosives include, but are not limited to, dynamite, black powder, pellet powder, detonators, and igniters.

The purchase of a firearm by a minor is generally unlawful. The use of a firearm, without proper state certification, is illegal. Students should check the training and certification requirements of individual states and countries.

- a. Projects involving firearms and explosives are allowable when conducted with the direct supervision of a Designated Supervisor and when in compliance with all federal, state and local laws.
- b. A fully assembled rocket motor, reload kit or propellant modules containing more than 62.5 grams of propellant are subject to the permitting, storage and other requirements of federal explosive laws and regulations.
- c. Potato guns and paintball guns are not considered firearms unless they are intended to be used as weapons. However, they must be treated as hazardous devices.

#### 5. Drones

Projects involving unmanned aircraft systems (UAS)/drones must follow all state, Federal and country laws. See the Federal Aviation Administration (FAA) for more details ([www.faa.gov/uas/registration](http://www.faa.gov/uas/registration)).

### Guidance for Risk Assessment

Please find below guidance on conducting risk assessment when using the following:

- Hazardous Chemicals
- Hazardous Devices
- Radiation

#### 1. Hazardous Chemicals

A proper risk assessment of chemicals must include review of the following factors:

- a. Toxicity – the tendency of a chemical to be hazardous to health when inhaled, swallowed, injected or in contact with the skin.
- b. Reactivity - the tendency of a chemical to undergo chemical change.
- c. Flammability - the tendency of a chemical to give off vapors which readily ignite when used under normal working conditions.
- d. Corrosiveness - the tendency of a chemical, upon physical contact, to harm or destroy living tissues or physical equipment.

When assessing risk, 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 of the chemical. The student researcher must refer to Safety Data Sheets provided by the vendor (SDS) to ensure that proper safety precautions are taken. Some SDS sheets (e.g., Flinn) rank the degree of hazard associated with a chemical. This rating may assist students and adult sponsors in determining risk associated with the use of a chemical.

A risk assessment must include proper disposal methods for the chemicals used in an experiment. The Flinn Catalog (referenced in the Sources of Information section) provides 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.

#### Environmentally Responsible Chemistry

The mission of environmentally responsible (green) chemistry is to avoid the use or production of hazardous substances during chemical process. The principles of green chemistry are described on the EPA website in the Sources of Information section. Whenever possible the following principles should be incorporated into the research plan.

- Waste prevention
- Use of the safest possible chemicals and products
- Design of the least possible hazardous chemical syntheses
- Use renewable materials
- Use catalysts in order to minimize chemical usage
- Use of solvents and reaction conditions that are safe as possible
- Maximization of energy efficiency
- Minimization of accident potential

#### 2. Hazardous Devices

The documentation of risk assessment (Form 3) is required when a student researcher works with potentially hazardous/dangerous equipment and/or other devices, in or outside a laboratory setting that require a moderate to high level of expertise to ensure their safe usage. Some commonly used devices (Bunsen burners, hot plates, saws, drills, etc.) may not require a documented risk assessment, assuming that the student researcher has experience working with the device. Use of other potentially dangerous devices such as high vacuum equipment, heated oil baths, NMR equipment, and high temperature ovens must have documentation of a risk assessment. It is recommended that all student designed inventions also have documentation of a risk assessment.

#### 3. Radiation

A risk assessment must be conducted when a student's project involves radiation beyond that normally encountered in everyday life. Non-ionizing radiation includes the spectrum of ultraviolet (UV), visible light, infrared (IR), microwave (MW), radiofrequency (RF) and extremely low frequency (ELF). Ionizing radiation has enough energy to remove tightly bound electrons from atoms, thus creating ions. Examples include high frequency UV, X-Rays, and gamma rays.

Lasers usually emit visible, ultraviolet or infrared radiation. Lasers are classified into four classes based upon their safety. Manufacturers are required to label Classes II – IV lasers

Projects involving radionuclides (radioisotopes) and X-rays must involve a careful examination of the risks associated with the study and appropriate safety precautions must be taken. Depending upon the level of exposure, radiation released from these sources can be a health hazard.

A risk assessment must take into account the time of exposure, distance and shielding involved in the study.

- a. A study of natural radiation that is no more than encountered in everyday life is exempt from the following requirements.
- b. All studies may not exceed the dose limits set by the Nuclear Regulatory Commission of 0.5 mrem/hr or 100 mrem/year of exposure.
- c. If the voltage needed in the study is <10 kvolts, a risk assessment must be conducted. The study may be done at home or school, and SRC preapproval is not required.
- d. A study using 10-25 kvolts must have a risk assessment conducted and must be preapproved by the SRC to

assess safety. Such a study must be conducted in a metal chamber using a camera only, not direct view through glass. A dosimeter or radiation survey meter is required to measure radiation exposure.

- e. All studies using > 25 kvolts must be conducted at an institution with a Licensed Radiation Program and must be preapproved by the Institutions' Radiation Safety Officer or the Committee which oversees the use of ionizing radiation to ensure compliance with state and federal regulations.

## Sources of Information for All Projects

1. United States Patent and Trade Office  
Customer Service: 1-800-786-9199 (toll-free);  
571-272-1000 (local); 571-272-9950 (TTY)  
[www.uspto.gov/](http://www.uspto.gov/)  
[www.uspto.gov/patents/process/index.jsp](http://www.uspto.gov/patents/process/index.jsp)
2. European Patent Office  
[www.epo.org/](http://www.epo.org/)  
[www.epo.org/applying/basics.html](http://www.epo.org/applying/basics.html)
3. The Mad Scientist Network at Washington University School of Medicine:  
[www.madsci.org](http://www.madsci.org)
4. ANS Task Force  
[www.anstaskforce.gov](http://www.anstaskforce.gov)

Aquatic Nuisance Species (ANS) Task Force  
[www.anstaskforce.gov](http://www.anstaskforce.gov)  
[www.anstaskforce.gov/Documents/ISEF.pdf](http://www.anstaskforce.gov/Documents/ISEF.pdf)

5. APHIS  
[www.aphis.usda.gov/](http://www.aphis.usda.gov/)  
Animal and Plant Health Inspection Service  
Invasive Species List
6. Invasive Species Specialist Group  
[www.issg.org](http://www.issg.org)  
The Global Invasive Species database contains invasive species information supplied by experts from around the world.
7. Invasive Species Information  
[www.invasivespeciesinfo.gov/resources/lists.shtml](http://www.invasivespeciesinfo.gov/resources/lists.shtml)  
Provides information for species declared invasive, noxious, prohibited, or harmful or potentially harmful.
8. *Success with Science: The Winner's Guide to High School Research*  
Gaglani, S. and DeObaldia, G. (2011). Research Corporation for Science Advancement.  
ISBN 0-9633504-8-X

## Human Participants

1. Code of Federal Regulation (CFR), Title 45 (Public Welfare), Part 46-Protection of Human Subjects (45CFR46)  
<http://ohsr.od.nih.gov/guidelines/45cfr46.html>
2. Dunn, C. M. and Chadwick, G. L., *Protecting Study Volunteers in Research*, 3rd Edition (2004). Boston, MA: Thomson Centerwatch. ISBN 1-930624-44-1.  
Can be purchased from:  
[www.amazon.com](http://www.amazon.com)

3. NIH tutorial, "Protecting Human Research Participants"  
<http://phrp.nihtraining.com/users/PHRP.pdf>
4. Belmont Report, April 18, 1979  
[www.hhs.gov/ohrp/humansubjects/guidance/belmont.html](http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html)
5. *Standards for Educational and Psychological Testing*. (1999). Washington, DC: AERA, APA, NCME.  
[www.apa.org/science/programs/testing/standards.aspx](http://www.apa.org/science/programs/testing/standards.aspx)
6. American Psychological Association  
750 First Street, NE Washington, DC 20002-4242  
phone: 202-336-5500; 800-374-2721  
[www.apa.org](http://www.apa.org)  
  
Information for students:  
[www.apa.org/science/leadership/students/information.aspx](http://www.apa.org/science/leadership/students/information.aspx)  
Information regarding publications:  
[www.apa.org/pubs/index.aspx](http://www.apa.org/pubs/index.aspx)
7. Educational and Psychological Testing  
Testing Office for the APA Science Directorate  
phone: 202-336-6000  
email: [testing@apa.org](mailto:testing@apa.org)  
[www.apa.org/science/programs/testing/index.aspx](http://www.apa.org/science/programs/testing/index.aspx)
8. The Children's Online Privacy Protection Act of 1998 (COPPA) (15 U.S.C. §§ 6501-6506)  
[www.ftc.gov/privacy/coppafaqs.shtml](http://www.ftc.gov/privacy/coppafaqs.shtml)

## Vertebrate Animals

### Animal Care and Use

1. *Laboratory Animals*, Institute of Laboratory Animal Research (ILAR), Commission on Life Sciences, National Research  
<http://dels.nas.edu/ilar>
2. *Guide for the Care and Use of Laboratory Animals, 8<sup>th</sup> Edition* (2011)  
<http://grants.nih.gov/grants/olaw/Guide-for-the-Care-and-Use-of-Laboratory-Animals.pdf>  
[www.nap.edu/catalog.php?record\\_id=12910](http://www.nap.edu/catalog.php?record_id=12910)
3. *Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research* (2003), Institute for Laboratory Animal Research (ILAR).  
[dels.nas.edu/report/guidelines-carey/10732](http://dels.nas.edu/report/guidelines-carey/10732)  
  
To order these ILAR publications contact:  
National Academies Press  
500 Fifth Street, NW  
Washington, DC 20055  
phone: 888-624-8373 or 202-334-3313; fax: 202-334-2451  
[www.nap.edu](http://www.nap.edu)
4. Federal Animal Welfare Act (AWA)  
7 U.S.C. 2131-2157  
Subchapter A - Animal Welfare (Parts I, II, III)  
[www.nal.usda.gov/awic/legislat/awicregs.htm](http://www.nal.usda.gov/awic/legislat/awicregs.htm)

Above document is available from:

USDA/APHIS/AC  
4700 River Road, Unit 84  
Riverdale, MD 20737-1234  
email: [ace@aphis.usda.gov](mailto:ace@aphis.usda.gov)  
phone: 301-734-7833; fax: 301-734-4978  
<http://awic.nal.usda.gov>



5. *Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (Agri-Guide)*  
Federation of Animal Science Societies (FASS)  
1800 S. Oak Street, Suite 100  
Champaign, IL 61820-6974  
phone: 217-356-3182  
email: [fass@assoqh.org](mailto:fass@assoqh.org)  
[www.fass.org](http://www.fass.org)
6. *Guidelines for the Use of Fish in Research* (2014), American Fisheries Society.  
[www.fisheries.org](http://www.fisheries.org)  
[www.fisheries.org/afs/docs/policy\\_16.pdf](http://www.fisheries.org/afs/docs/policy_16.pdf)
7. *Euthanasia Guidelines*  
AVMA Guidelines on Euthanasia (2013)  
American Veterinary Medical Association  
[www.avma.org/KB/Policies/Documents/euthanasia.pdf](http://www.avma.org/KB/Policies/Documents/euthanasia.pdf)
5. *Johns Hopkins Center for Alternatives to Animal Testing* (CAAT) has worked with scientists since 1981 to find new methods to replace the use of laboratory animals in experiments, reduce the number of animals tested, and refine necessary tests to eliminate pain and distress.  
email: [caat@jhsp.edu](mailto:caat@jhsp.edu)  
<http://caat.jhsp.edu/>
6. Quality Assurance Manuals (for appropriate species)  
Such as:  
Poultry: <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELDEV3002393>  
Beef: <http://www.bqa.org/manuals.aspx>  
Pork: <http://old.pork.org/filelibrary/youthpqaplus/ypqamanual.pdf>

### Potentially Hazardous Biological Agents

### Alternative Research and Animal Welfare

1. *The National Library of Medicine* provides computer searches through MEDLINE:  
Reference & Customer Services  
National Library of Medicine  
8600 Rockville Pike  
Bethesda, MD 20894  
888-FIND-NLM or 888-346-3656; 301-594-5983;  
email: [info@ncbi.nlm.nih.gov](mailto:info@ncbi.nlm.nih.gov)  
[www.nlm.nih.gov](http://www.nlm.nih.gov)  
[www.ncbi.nlm.nih.gov/sites/entrez](http://www.ncbi.nlm.nih.gov/sites/entrez)
2. *National Agriculture Library* (NAL) provides reference service for materials that document a) Alternative Procedures to Animal Use and b) Animal Welfare.  
Animal Welfare Information Center  
National Agriculture Library  
10301 Baltimore Avenue, Room 410  
Beltsville, MD 20705-2351  
phone: 301-504-6212, fax: 301-504-7125  
email: [awic@ars.usda.gov](mailto:awic@ars.usda.gov)  
[www.nal.usda.gov/awic](http://www.nal.usda.gov/awic)
3. *Institute of Laboratory Animal Resources* (ILAR) provides a variety of information on animal sources, housing and handling standards, and alternatives to animal use through annotated bibliographies published quarterly in ILAR Journal.  
ILAR - The Keck Center of the National Academies  
500 Fifth Street, NW, Keck 687  
Washington, DC 20001  
phone: 202-334-2590, fax: 202-334-1687  
email: [ILAR@nas.edu](mailto:ILAR@nas.edu)  
<http://dels.nas.edu/ilar>
4. Quarterly bibliographies of Alternatives to the Use of Live Vertebrates in Biomedical Research and Testing may be obtained from:  
Specialized Information Services  
NLM/NIH  
2 Democracy Plaza, Suite 510  
6707 Democracy Blvd., MSC 5467  
Bethesda, MD 20892-5467  
phone: 301-496-1131; Fax: 301-480-3537  
email: [tehip@tehl.nlm.nih.gov](mailto:tehip@tehl.nlm.nih.gov)  
[www.sis.nlm.nih.gov](http://www.sis.nlm.nih.gov);  
<http://toxnet.nlm.nih.gov/altbib.html>
1. American Biological Safety Association: ABSA Risk Group Classification – list of organisms  
[www.absa.org](http://www.absa.org)
2. American Type Culture Collection (ATCC)  
[www.atcc.org](http://www.atcc.org)
3. Bergey's Manual of Systematic Bacteriology website – follow the links for resources and microbial databases for a collection of international websites of microorganisms and cell cultures.  
[www.bergeys.org/resources.html](http://www.bergeys.org/resources.html)
4. Biosafety in Microbiological and Biomedical Laboratories (BMBL) – 4th Edition. Published by CDC-NIH,  
[www.cdc.gov/biosafety/publications/bmb15/BMBL.pdf](http://www.cdc.gov/biosafety/publications/bmb15/BMBL.pdf)
5. World Health Organization Laboratory Safety Manual  
[www.who.int/diagnostics\\_laboratory/guidance/en/](http://www.who.int/diagnostics_laboratory/guidance/en/)
6. Canada – Agency of Public Health – list of non-pathogenic organisms  
[www.phac-aspc.gc.ca/lab-bio/index\\_eng.php](http://www.phac-aspc.gc.ca/lab-bio/index_eng.php)  
[www.phac-aspc.gc.ca/lab-bio/res/index-eng.php](http://www.phac-aspc.gc.ca/lab-bio/res/index-eng.php)
7. Microorganisms for Education Website – list of organisms  
[www.science-projects.com/safemicrobes.htm](http://www.science-projects.com/safemicrobes.htm)
8. *NIH Guidelines for Research Involving Recombinant DNA Molecules*. Published by National Institutes of Health.  
<http://osp.od.nih.gov/office-biotechnology-activities/oba/index.html>
9. OSHA – Occupational Health and Safety Administration  
[www.osha.gov](http://www.osha.gov)

### Hazardous Chemicals, Activities or Devices

#### General Lab/Chemical Safety

1. *Safety in Academic Chemistry Laboratories, Volumes 1 and 2*, 2003. Washington, DC: American Chemical Society.  
Order from (first copy free of charge):  
American Chemical Society  
Publications Support Services  
1155 16th Street, NW  
Washington, DC 20036  
phone: 202-872-4000 or 800-227-5558  
email: [help@acs.org](mailto:help@acs.org)  
[www.acs.org/education](http://www.acs.org/education)

2. General  
Howard Hughes Medical Institute has resources for working with cell cultures, radioactive materials and other laboratory materials.  
[www.hhmi.org/resources/](http://www.hhmi.org/resources/)
3. Environmental Protection Agency (EPA) website for green chemistry  
[www.epa.gov/greenchemistry](http://www.epa.gov/greenchemistry)
4. Safety and Data Sheets (SDS)  
[www.flinnsci.com/msds-search.aspx](http://www.flinnsci.com/msds-search.aspx)  
A directory of SDS sheets from Flinn Scientific Inc. that includes a ranking of hazard level and disposal methods.  
  
[www.ilpi.com/msds/index.html](http://www.ilpi.com/msds/index.html) - A listing of numerous sites that have free downloads of MSDS sheets.
5. Pesticides  
National Pesticide Information Center  
<http://npic.orst.edu/ingred/products.html>  
Describes the various types of pesticides and the legal requirements for labelling. Provides links and phone numbers to get additional information.  
  
Environmental Protection Agency  
<http://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1>  
A database of product labels. Enter the product name or company name to view the approved label information of pesticides which are registered with the agency.
6. DEA Controlled Substances  
Drug Enforcement Agency website:  
[www.justice.gov/dea/index.htm](http://www.justice.gov/dea/index.htm)  
Controlled Substance Schedules—a list of controlled substances:  
[www.deadiversion.usdoj.gov/schedules/](http://www.deadiversion.usdoj.gov/schedules/)
7. Alcohol, Tobacco, Firearms, and Explosives  
Alcohol and Tobacco Tax and Trade Bureau  
[www.ttb.gov/](http://www.ttb.gov/)  
Bureau of Alcohol, Tobacco, Firearms and Explosives  
[www.atf.gov](http://www.atf.gov)
8. Radiation  
Radiation Studies Information (CDC)  
[www.cdc.gov/nceh/radiation/default.htm](http://www.cdc.gov/nceh/radiation/default.htm)
9. CDC Laboratory Safety Manuals  
[www.cdc.gov/biosafety/publications/index.htm](http://www.cdc.gov/biosafety/publications/index.htm)
10. Occupational Safety and Health Administration  
[www.osha.gov](http://www.osha.gov)  
Safety and Health Topics:  
[www.osha.gov/SLTC/](http://www.osha.gov/SLTC/)  
[www.osha.gov/SLTC/reactivechemicals/index.html](http://www.osha.gov/SLTC/reactivechemicals/index.html)  
[www.osha.gov/SLTC/laserhazards/index.html](http://www.osha.gov/SLTC/laserhazards/index.html)  
[www.osha.gov/SLTC/radiationionizing/index.html](http://www.osha.gov/SLTC/radiationionizing/index.html)
11. U.S. Nuclear Regulatory Commission  
Material Safety and Inspection Branch  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852  
phone: 301-415-8200; 800-368-5642  
[www.nrc.gov](http://www.nrc.gov)

# Intel ISEF Display and Safety Regulations

Please address any questions regarding Intel ISEF Display and Safety Regulations to  
Diane Hecht, Display and Safety Committee Chair at [displayandsafety@societyforscience.org](mailto:displayandsafety@societyforscience.org)

## Display and Safety Authority

The Intel ISEF Display and Safety Committee is the final authority on display and safety issues for projects approved by the SRC to compete in the Intel ISEF. Occasionally, the Intel ISEF Display and Safety Committee may require students to make revisions to conform to display and safety regulations. The Regulations that follow have been divided into two main categories to separate those that deal specifically with display regulations and those that pertain to safety regulations.

## Display Regulations

The following regulations must be adhered to when a finalist exhibits a project at Intel ISEF.

### Maximum Size of Project

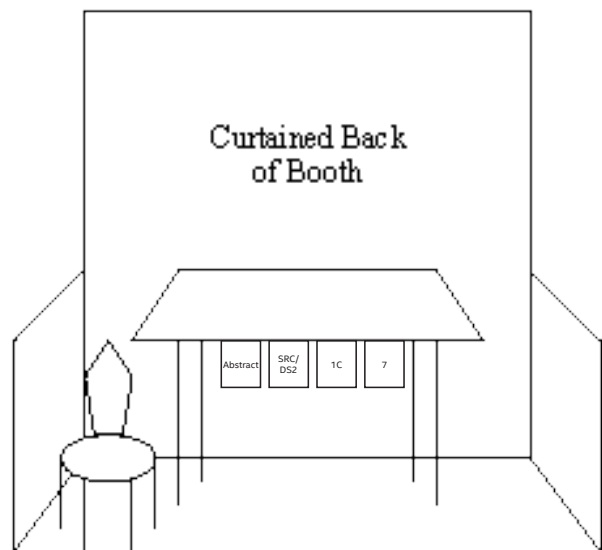
**Depth** (front to back): 30 inches or 76 centimeters

**Width** (side to side): 48 inches or 122 centimeters

**Height** (floor to top): 108 inches or 274 centimeters

Please be aware when ordering posters that the mechanism that supports the poster should conform to the maximum size limitations stated above.

1. All project materials and support mechanisms must fit within the project dimensions.
2. Fair provided tables will not exceed a height of 36 inches (91 centimeters).
3. If a table is used it becomes part of the project and must not exceed the allowed dimensions.
4. Nothing can be attached to the rear curtain for display.
5. All demonstrations must be done within the confines of the finalist booth. When not being demonstrated, the component must be returned to project and must fit within allowable dimensions.



### Position of Project

Position of project must be parallel to, and positioned at, the back curtain of the booth. Projects may NOT lean against the back curtain.

## Display Content for Regulated Research Institution and/or Continuation Projects

1. Regulated Research Institution Projects  
The display must reflect on the work conducted by the finalist.
  - Minimal reference to mentor's or other researcher's work must only reflect background information or be used to clarify differences between finalist's and others' work.
  - If Box 3 is checked YES on the official Intel ISEF Abstract and Certification, Regulated Research Institution/Industrial Setting Form 1C must be vertically displayed.
2. Continuation Projects  
The display board should summarize ONLY the CURRENT year's work.
  - The Title may include the duration of the project (for example, "Year Two of an Ongoing Study").
  - Minimum reference to conclusions of previous years' work may be shown without any specific data being displayed.
  - If Box 4 is checked YES on the official Intel ISEF Abstract and Certification, Continuation Form 7 must be vertically displayed, summarizing clear differences between current and previous years' work.

## Forms Required to be Visible and Vertically Displayed

The suggested placement of the required forms is on the front edge of the table, on the display board, or in a free-standing frame placed on the table top.

### Forms required at all projects:

1. Original of official Abstract and Certification as approved and stamped/embossed by the Intel ISEF Scientific Review Committee.
2. Completed Intel ISEF Project Set-up Approval Form SRC/DS2 (Received on-site at the Fair)

### Forms required when applicable (indicated on Form SRC/DS2)

1. Regulated Research Institutional/Industrial Setting Form (1C)
2. Continuation Projects Form (7)

### Completed Informed Consent Forms Not to be Displayed

Completed informed consent forms are not allowed to be present at the project display.

## Forms Required at Project but not Displayed

Forms including, but not limited to, **Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/Project Summary and Approval Form (1B)** which are required for the project or for Scientific Review Committee approval do not have to be displayed as part of the project but must be available in the booth in case asked for by a judge or other Intel ISEF official. A photograph/video release form signed by the subject is required for visual images of humans (other than the finalist) displayed as part of the project. All other forms not specifically called for in the above sections are **NOT** required to be Displayed at the booth.

## Photograph/Image Display Requirements

Display of photographs other than that of the finalist must have a photo release signed by the subject, and if under 18 years of age, also by the guardian of the subject. Sample consent text: "I consent to the use of visual images (photos, videos, etc.) involving my participation/my child's participation in this research." (These forms must be available upon request by a Display & Safety Inspector, but shall not be displayed.)

Finalists using audio-visual or multi-media presentations (for example, 35mm slides, videotapes, images, graphics, animations, etc., displayed on computer monitors; or other non-print presentation methods) must be prepared to show the entire presentation to the Display and Safety Inspectors before the project is approved.

Any photograph/visual image/chart/table and/or graph is allowed if:

1. It is not deemed offensive or inappropriate (which includes images/photographs showing invertebrate or vertebrate animals/humans in surgical, necrotizing or dissection situations) by the Scientific Review Committee, the Display and Safety Committee, or Society for Science & the Public. The decision made by any one of the groups mentioned above is final.
2. It has a credit line of origin ("Photograph taken by..." or "Image taken from..." or "Graph/Chart/Table taken from..."). (If all images, etc. being displayed were taken or created by the finalist or are from the same source, one credit line prominently and vertically displayed on the backboard/poster or tabletop is sufficient.)
3. It is from the Internet, magazine, newspaper, journal, etc., and a credit line is attached. (If all photographs, etc. are from the same source, one credit prominently and vertically displayed is sufficient.)
4. It is a photograph or visual depiction of the finalist.
5. It is a photograph or visual depiction for which a signed consent form is at the project or in the booth.

## Handouts Allowed at Project

### Official Abstract

Handouts to judges and to the public must be limited to UNALTERED photocopies of the official abstract and certification.

The Intel ISEF Scientific Review Committee defines the "official abstract and certification" as an UNALTERED original abstract and certification as stamped/embossed by the Intel ISEF Scientific Review Committee. If the Scientific Review Committee requires a finalist to make changes to the abstract and certification submitted with registration papers, the revised version will be stamped/embossed, will replace the earlier version, and will become the finalist's official abstract and certification.

1. The finalist will be provided with 20 copies of the Official Abstract and Certification.
2. The term abstract may **NOT** be used as a title or reference for any information on a finalist's display or materials at the project except as part of displaying the official abstract.
3. An original stamp/embossed official abstract and certification must be vertically displayed at the project.

## Items/Materials Not Allowed at Project

The following is a list of what cannot be displayed at the project:

1. **Any items that are acknowledgments, self-promotions or external endorsements** (such as naming the research institution, mentor or patent pending statements) and/or are intended for distribution including:
  - a. Any disks, CDs, business cards, printed materials, etc. (including unofficial abstracts) designed to be distributed to judges or the public
  - b. Flash drives, brochures, booklets, endorsements, and additional give-away items including, but not limited to, pins, key chains, food etc.
  - c. Any awards or medals, except for past or present Intel ISEF medals that may be worn by the finalist.
2. Postal addresses, World Wide Web, email and/or social media addresses, QR codes, telephone and/or fax numbers of a project or finalist.
3. Active Internet or email connections as part of displaying or operating the project at the Intel ISEF.
4. Prior year's written material or visual depictions on the vertical display board (Exception: The project title displayed in the finalist's booth may mention duration of the project). For example, Year 2 of an Ongoing Study. Please note continuation projects must vertically display the Continuation Project Form 7.

\* Any attempt to replenish or return removed items from the above list is a violation of the Ethics Agreement and will result in items being confiscated by the Display and Safety Committee and may result in the project failing to qualify for competition.

## Other Display Regulations

1. No changes, modifications, or additions to projects may be made after approval by the Display and Safety Committee and the Scientific Review Committee. Finalists who do not adhere to the signed agreement on the SRC/DS2 Form regarding this regulation will fail to qualify for competition.
2. If a project fails to qualify and is not removed by the finalist, Society for Science & the Public will remove the project in the safest manner possible but is not responsible for damage to the project.
3. It is highly recommended that your project number be placed on all notebooks or materials that will be left at your booth. A project data book and research paper are not required but are highly recommended.
4. Judges will preview projects without finalist's present beginning at noon on Tuesday.
5. **No Acknowledgements.**



## Safety Regulations

The following regulations must be adhered to when a finalist exhibits a project at Intel ISEF.

### Not Allowed at Project or Booth

1. Living organisms, including plants
2. Soil, sand, rock, cement and/or waste samples, even if permanently encased in a slab of acrylic
3. Taxidermy specimens or parts
4. Preserved vertebrate or invertebrate animals
5. Human or animal food as part of the exhibitor demonstration of the project.
6. Human/animal parts or body fluids (for example, blood, urine)
7. Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non-manufactured state (Exception: manufactured construction materials used in building the project or display)
8. All chemicals including water (projects may not use water in any form in a demonstration)
9. All hazardous substances or devices (Example: poisons, drugs, firearms, weapons, ammunition, reloading devices, and lasers)
10. Items that may have contained or been in contact with hazardous chemicals (Exception: Item may be permitted if professionally cleaned and document for such cleaning is available)
11. 3-D Printers
12. Dry ice or other sublimating solids
13. Sharp items (for example, syringes, needles, pipettes, knives)
14. Flames or highly flammable materials (including magnified light sources)
  - a. A Fresnel Lens cannot be used in conjunction with a light source – it becomes an open flame.
15. Batteries with open-top cells or wet cells
16. Glass or glass objects unless deemed by the Display and Safety Committee to be an integral and necessary part of the project (for example, glass that is an integral part of a commercial product such as a computer screen)
17. Any apparatus deemed unsafe by the Scientific Review Committee, the Display and Safety Committee, or Society for Science & the Public (Example: large vacuum tubes or dangerous ray-generating devices, empty tanks that previously contained combustible liquids or gases, pressurized tanks, 3D printers etc.)

### Electrical Regulations at Intel ISEF

1. Electrical power supplied to the project is 120 or 220 Volt, AC, single phase, 60 cycle. No multi-phase will be available or shall be used. Maximum circuit amperage/wattage available is determined by the electrical circuit capacities of the exhibit hall and may be adjusted on-site by the Display and Safety Committee. For all electrical regulations, "120 Volt AC" or "220 Volt AC" is intended to encompass the corresponding range of voltage as supplied by the facility in which the Intel ISEF is being held.
2. Electrical devices must be protectively enclosed. Any enclosure must be non-combustible. All external non-current carrying metal parts must be grounded.
3. Energized wiring, switches, and metal parts must have adequate insulation and over-current safety devices (such as fuses) and must be inaccessible to anyone other than the finalist. Exposed electrical equipment or metal that possibly may be energized must be shielded with a non-conducting

material or with a grounded metal box to prevent accidental contact.

4. Decorative lighting or illumination is discouraged. If used, lighting must be as low a voltage as possible and must be LED lighting that does not generate heat. Light bulbs are prohibited. When student is not at the exhibit, all electrical power must be disconnected, or power bars must be switched off (Exception: during pre-judging audio visual displays may be available).
5. An insulating grommet is required at the point where any wire or cable enters any enclosure.
6. No exposed live circuits over 36 volts are allowed.
7. There must be an accessible, clearly visible on/off switch or other means of quickly disconnecting from the 120 or 220 Volt power source.

### Laser Requirements

Any Class 1 or Class 2 lasers, along with only Class 3A or 3R lasers, are allowed to be used provided a finalist avoids indiscriminate exposure to other finalists, judges, or visitors (except if passed through magnifying optics such as microscopes and telescopes, in which case they may not be used). No other lasers may be used or displayed.

1. Any laser must be labeled by the manufacturer so that power output can be inspected. Lasers without labels will NOT be "cleared."
2. LED's that consume over 1 watt, unless they are in a commercial light bulb/ fixture or otherwise shielded, will not be allowed.
3. Lasers will be confiscated with no warning if not used in a safe manner. Serious offenses may result in failure to qualify.

### Other Safety Regulations

1. Any inadequately insulated apparatus producing extreme temperatures that may cause physical burns is not allowed.
2. Any apparatus with unshielded belts, pulleys, chains, or moving parts with tension or pinch points must be for display only.
3. Society for Science & the Public, the Scientific Review Committee, and/or the Display and Safety Committee reserve the right to remove any project for safety reasons or to protect the integrity of the Intel ISEF and its rules and regulations.
4. Project sounds, lights, odors, or any other display items must not be distracting. Exceptions to this rule may be permitted for judging demonstrations. Approval must be given prior to judging.
5. Projects can be continued under the table BUT this area is not to be used for storage. No personal items or packaging materials may be stored underneath the booth.

# Information on Required Abstract & Certification for ALL Projects at the Intel ISEF

*\* This form may not be relevant for your regional or state fair; please refer to instructions from your affiliated fair.\**

In ADDITION to the basic form requirements for ALL Projects and any other requirements due to specific areas of research, an Abstract & Certification is required at the conclusion of research. Details on this requirement follow.

## Completing the Abstract

After finishing research and experimentation, you are required to write a (maximum) 250 word, one-page abstract. This is written on the Official Abstract and Certification Form as provided by Society for Science & the Public. It is recommended that it **include the following:**

- a. *purpose of the experiment*
- b. *procedure*
- c. *data*
- d. *conclusions*

It may also include any possible research applications. Only minimal reference to previous work may be included. An abstract **must not include the following:**

- a. *acknowledgments (including naming the research institution and/or mentor with which you were working), or self-promotions and external endorsements*
- b. *work or procedures done by the mentor*

## Completing the Certification

At the bottom of the Abstract & Certification form there are six questions. Please read each carefully and answer appropriately. The Intel ISEF Scientific Research Committee will review and approve the abstract and answers to the questions.

Revisions or questions will be resolved via a SRC appointment on site at the Intel ISEF. Please bring an electronic copy of your Abstract & Certification to the Fair. Only after final Intel ISEF SRC approval has been obtained via a stamped/embossed copy of this Abstract & Certification may a Finalist make copies to hand out to the judges and the public. (the Society provides the first 20 copies.)

## Intel ISEF Sample Abstract & Certification

Title  
Finalist's Name  
School Name, City and State, Country

Start Typing the Body of Your Abstract Here Beginning at the Left Margin

Category  
Pick one only--  
mark an "X" in  
box at right

- |                          |  |
|--------------------------|--|
| <input type="checkbox"/> | Animal Sciences                          |
| <input type="checkbox"/> | Behavioral and Social Sciences           |
| <input type="checkbox"/> | Biochemistry                             |
| <input type="checkbox"/> | Biomedical and Health Sciences           |
| <input type="checkbox"/> | Biomedical Engineering                   |
| <input type="checkbox"/> | Cellular & Molecular Biology             |
| <input type="checkbox"/> | Chemistry                                |
| <input type="checkbox"/> | Computational Biology and Bioinformatics |
| <input type="checkbox"/> | Earth & Environmental Sciences           |
| <input type="checkbox"/> | Embedded Systems                         |
| <input type="checkbox"/> | Energy: Chemical                         |
| <input type="checkbox"/> | Energy: Physical                         |
| <input type="checkbox"/> | Engineering Mechanics                    |
| <input type="checkbox"/> | Environmental Engineering                |
| <input type="checkbox"/> | Materials Science                        |
| <input type="checkbox"/> | Mathematics                              |
| <input type="checkbox"/> | Microbiology                             |
| <input type="checkbox"/> | Physics and Astronomy                    |
| <input type="checkbox"/> | Plant Sciences                           |
| <input type="checkbox"/> | Robotics & Intelligent Machines          |
| <input type="checkbox"/> | Systems Software                         |
| <input type="checkbox"/> | Translational Medical Science            |

1. As a part of this research project, the student directly handled, manipulated, or interacted with (check all that apply):

- |                          |                    |                          |  |                          |      |                          |        |
|--------------------------|--------------------|--------------------------|--|--------------------------|------|--------------------------|--------|
| <input type="checkbox"/> | human participants | <input type="checkbox"/> | potentially hazardous biological agents: |                          |      |                          |        |
| <input type="checkbox"/> | vertebrate animals | <input type="checkbox"/> | microorganisms                           | <input type="checkbox"/> | rDNA | <input type="checkbox"/> | tissue |

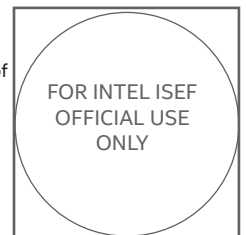
2. This abstract describes only procedures performed by me/us, reflects my/our own independent research, and represents one year's work only.  yes  no

3. I/We worked or used equipment in a regulated research institution or industrial setting.  yes  no

4. This project is a continuation of previous research.  yes  no

5. My display board includes non-published photographs/visual depictions of humans (other than myself):  yes  no

6. I/We hereby certify that the abstract and responses to the above statements are correct and properly reflect my/our own work.  yes  no



**NOTE:** Your abstract must be on the Intel International Science and Engineering Fair Abstract & Certification form and embossed/ stamped by the Intel ISEF Scientific Review Committee before it is displayed or handed out. No pasted or taped text will be permitted. No other format or version of your approved Abstract & Certification will be allowed for any purpose at the Intel ISEF.

# Intel ISEF Categories and Subcategories

The categories have been established with the goal of better aligning judges and student projects for the judging at the Intel ISEF. Local, regional, state and country fairs may or may not choose to use these categories, dependent on the needs of their area. Please check with your affiliated fair(s) for the appropriate category listings at that level of competition.

Please visit our website at [student.societyforscience.org/intel-isef-categories-and-subcategories](http://student.societyforscience.org/intel-isef-categories-and-subcategories) for a full description and definition of the Intel ISEF categories:

## **ANIMAL SCIENCES**

Animal Behavior  
Cellular Studies  
Development  
Ecology  
Genetics  
Nutrition and Growth  
Physiology  
Systematics and Evolution  
Other

## **BEHAVIORAL AND SOCIAL SCIENCES**

Clinical and Developmental Psychology  
Cognitive Psychology  
Physiological Psychology  
Sociology and Social Psychology  
Other

## **BIOCHEMISTRY**

Analytical Biochemistry  
General Biochemistry  
Medicinal Biochemistry  
Structural Biochemistry  
Other

## **BIOMEDICAL AND HEALTH SCIENCES**

Disease Diagnosis  
Disease Treatment  
Drug Development and Testing  
Epidemiology  
Nutrition  
Physiology and Pathology  
Other

## **BIOMEDICAL ENGINEERING**

Biomaterials and Regenerative Medicine  
Biomechanics  
Biomedical Devices  
Biomedical Imaging  
Cell and Tissue Engineering  
Synthetic Biology  
Other

## **CELLULAR AND MOLECULAR BIOLOGY**

Cell Physiology  
Genetics  
Immunology  
Molecular Biology  
Neurobiology  
Other

## **CHEMISTRY**

Analytical Chemistry  
Computational Chemistry  
Environmental Chemistry  
Inorganic Chemistry  
Materials Chemistry  
Organic Chemistry  
Physical Chemistry  
Other

## **COMPUTATIONAL BIOLOGY AND BIOINFORMATICS**

Biomedical Engineering  
Computational Pharmacology  
Computational Biomodeling  
Computational Evolutionary Biology  
Computational Neuroscience  
Genomics  
Other

## **EARTH AND ENVIRONMENTAL SCIENCES**

Atmospheric Science  
Climate Science  
Environmental Effects on Ecosystems  
Geosciences  
Water Science  
Other

## **EMBEDDED SYSTEMS**

Circuits  
Internet of Things  
Microcontrollers  
Networking and Data Communications  
Optics  
Sensors  
Signal Processing  
Other

## **ENERGY: CHEMICAL**

Alternative Fuels  
Computational Energy Science  
Fossil Fuel Energy  
Fuel Cells and Battery Development  
Microbial Fuel Cells  
Solar Materials  
Other

## **ENERGY: PHYSICAL**

Hydro Power  
Nuclear Power  
Solar  
Sustainable Design

Thermal Power  
Wind  
Other

## **ENGINEERING MECHANICS**

Aerospace and Aeronautical Engineering  
Civil Engineering  
Computational Mechanics  
Control Theory  
Ground Vehicle Systems  
Industrial Engineering-Processing  
Mechanical Engineering  
Naval Systems  
Other

## **ENVIRONMENTAL ENGINEERING**

Bioremediation  
Land Reclamation  
Pollution Control  
Recycling and Waste Management  
Water Resources Management  
Other

## **MATERIALS SCIENCE**

Biomaterials  
Ceramic and Glasses  
Composite Materials  
Computation and Theory  
Electronic, Optical and Magnetic Materials  
Nanomaterials  
Polymers  
Other

## **MATHEMATICS**

Algebra  
Analysis  
Combinatorics, Graph Theory, and Game Theory  
Geometry and Topology  
Number Theory  
Probability and Statistics  
Other

## **MICROBIOLOGY**

Antimicrobials and Antibiotics  
Applied Microbiology  
Bacteriology  
Environmental Microbiology  
Microbial Genetics  
Virology  
Other

## **PHYSICS AND ASTRONOMY**

Astronomy and Cosmology

Atomic, Molecular, and Optical Physics  
Biological Physics  
Computational Physics and Astrophysics  
Condensed Matter and Materials Instrumentation  
Magnetics, Electromagnetics and Plasmas  
Mechanics  
Nuclear and Particle Physics  
Optics, Lasers, Masers  
Quantum Computation  
Theoretical Physics  
Other

## **PLANT SCIENCES**

Agronomy  
Ecology  
Genetics/Breeding  
Growth and Development  
Pathology  
Physiology  
Systematics and Evolution  
Other

## **ROBOTICS AND INTELLIGENT MACHINES**

Biomechanics  
Cognitive Systems  
Control Theory  
Machine Learning  
Robot Kinematics  
Other

## **SYSTEMS SOFTWARE**

Algorithms  
Cybersecurity  
Databases  
Operating Systems  
Programming Languages  
Other

## **TRANSLATIONAL MEDICAL SCIENCES**

Disease Detection and Diagnosis  
Disease Prevention  
Disease Treatment and Therapies  
Drug Identification and Testing  
Pre-Clinical Studies  
Other

# Checklist for Adult Sponsor (1)

This completed form is required for ALL projects.

To be completed by the Adult Sponsor in collaboration with the student researcher(s):

Student's Name(s): \_\_\_\_\_

Project Title: \_\_\_\_\_

1.  I have reviewed the Intel ISEF Rules and Guidelines.
2.  I have reviewed the student's completed Student Checklist (1A) and Research Plan/Project Summary.
3.  I have worked with the student and we have discussed the possible risks involved in the project.
4.  The project involves one or more of the following and requires prior approval by an SRC, IRB, IACUC or IBC:
  - Humans  Potentially Hazardous Biological Agents
  - Vertebrate Animals  Microorganisms  rDNA  Tissues
5.  Items to be completed for **ALL PROJECTS**
  - Adult Sponsor Checklist (1)  Research Plan/Project Summary
  - Student Checklist (1A)  Approval Form (1B)
  - Regulated Research Institutional/Industrial Setting Form (1C) (when applicable; after completed experiment)
  - Continuation/Research Progression Form (7) (when applicable)
6. **Additional forms required if the project includes the use of one or more of the following** (check all that apply):
  - Humans** (Requires prior approval by an Institutional Review Board (IRB); see full text of the rules.)
  - Testing student designed invention/prototype**
    - Human Participants Form (4) or appropriate Institutional IRB documentation
    - Sample of Informed Consent Form (when applicable and/or required by the IRB)
    - Qualified Scientist Form (2) (when applicable and/or required by the IRB)
  - Vertebrate Animals** (Requires prior approval, see full text of the rules.)
    - Vertebrate Animal Form (5A) - for projects conducted in a school/home/field research site (SRC prior approval required.)
    - Vertebrate Animal Form (5B) - for projects conducted at a Regulated Research Institution. (Institutional Animal Care and Use Committee (IACUC) approval required prior experimentation.)
    - Qualified Scientist Form (2) (Required for all vertebrate animal projects at a regulated research site or when applicable)
  - Potentially Hazardous Biological Agents** (Requires prior approval by SRC, IACUC or Institutional Biosafety Committee (IBC), see full text of the rules.)
    - Potentially Hazardous Biological Agents Risk Assessment Form (6A)
    - Human and Vertebrate Animal Tissue Form (6B) - to be completed in addition to Form 6A when project involves the use of fresh or frozen tissue, primary cell cultures, blood, blood products and body fluids.
    - Qualified Scientist Form (2) (when applicable)
  - Hazardous Chemicals, Activities and Devices** (No SRC prior approval required, see full text of the rules.)
    - Risk Assessment Form (3)
    - Qualified Scientist Form (2) (required for projects involving DEA-controlled substances or when applicable)

Note: The following are exempt from prior review but require a Risk Assessment Form 3: projects involving protists, archae and similar microorganisms, for projects using manure for composting, fuel production or other non-culturing experiments, for projects using color change coliform water test kits, microbial fuel cells, and for projects involving decomposing vertebrate organisms.

Adult Sponsor's Printed Name \_\_\_\_\_ Signature \_\_\_\_\_ Date of Review \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_



# Student Checklist (1A)

This form is required for ALL projects.

1. a. Student/Team Leader: \_\_\_\_\_ Grade: \_\_\_\_\_  
Email: \_\_\_\_\_ Phone: \_\_\_\_\_  
b. Team Member: \_\_\_\_\_ c. Team Member: \_\_\_\_\_
2. Title of Project:  
\_\_\_\_\_
3. School: \_\_\_\_\_ School Phone: \_\_\_\_\_  
School Address: \_\_\_\_\_  
\_\_\_\_\_
4. Adult Sponsor: \_\_\_\_\_ Phone/Email: \_\_\_\_\_
5. Does this project need SRC/IRB/IACUC or other pre-approval?  Yes  No Tentative start date: \_\_\_\_\_
6. Is this a continuation/progression from a previous year?  Yes  No  
If Yes:
  - a. Attach the previous year's  Abstract **and**  Research Plan/Project Summary
  - b. Explain how this project is new and different from previous years on  Continuation/Research Progression Form (7)
7. This year's laboratory experiment/data collection:  
\_\_\_\_\_  
Actual Start Date: (mm/dd/yy) \_\_\_\_\_ End Date: (mm/dd/yy) \_\_\_\_\_
8. Where will you conduct your experimentation? (check all that apply)  
 Research Institution  School  Field  Home  Other: \_\_\_\_\_
9. List name and address of all non-school work site(s):  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
Phone: \_\_\_\_\_
10. **Complete a Research Plan/Project Summary following the Research Plan/Project Summary instructions and attach to this form.**
11. **An abstract is required for all projects after experimentation.**

# Research Plan/Project Summary Instructions

A complete Research Plan/Project Summary is required for ALL projects and must accompany Student Checklist (1A).

1. All projects must have a Research Plan/Project Summary written prior to experimentation following the instructions below to detail the rationale, research question(s), methodology, and risk assessment of the proposed research.
  - a. If changes are made during the research, such changes can be added to the original research plan as an addendum, recognizing that some changes may require returning to the IRB or SRC for appropriate review and approvals. If no additional approvals are required, this addendum serves as a project summary to explain research that was conducted.
  - b. If no changes are made from the original research plan, no project summary is required.
2. Some studies, such as an engineering design or mathematics projects, will be less detailed in the initial project plan and will change through the course of research. If such changes occur, a project summary that explains what was done is required and can be appended to the original research plan.
3. The Research Plan/Project Summary should include the following:
  - a. **RATIONALE:** Include a brief synopsis of the background that supports your research problem and explain why this research is important and if applicable, explain any societal impact of your research.
  - b. **RESEARCH QUESTION(S), HYPOTHESIS(ES), ENGINEERING GOAL(S), EXPECTED OUTCOMES:** How is this based on the rationale described above?
  - c. Describe the following in detail:
    - **Procedures:** Detail all procedures and experimental design including methods for data collection. Describe only your project. Do not include work done by mentor or others.
    - **Risk and Safety:** Identify any potential risks and safety precautions needed.
    - **Data Analysis:** Describe the procedures you will use to analyze the data/results.
  - d. **BIBLIOGRAPHY:** List major references (e.g. science journal articles, books, internet sites) from your literature review. If you plan to use vertebrate animals, one of these references must be an animal care reference.

Items 1–4 below are subject-specific guidelines for additional items to be included in your research plan/project summary as applicable.

## 1. Human participants research:

- a. **Participants:** Describe age range, gender, racial/ethnic composition of participants. Identify vulnerable populations (minors, pregnant women, prisoners, mentally disabled or economically disadvantaged).
- b. **Recruitment:** Where will you find your participants? How will they be invited to participate?
- c. **Methods:** What will participants be asked to do? Will you use any surveys, questionnaires or tests? What is the frequency and length of time involved for each subject?
- d. **Risk Assessment:** What are the risks or potential discomforts (physical, psychological, time involved, social, legal, etc.) to participants? How will you minimize risks? List any benefits to society or participants.
- e. **Protection of Privacy:** Will identifiable information (e.g., names, telephone numbers, birth dates, email addresses) be collected? Will data be confidential/anonymous? If anonymous, describe how the data will be collected. If not anonymous, what procedures are in place for safeguarding confidentiality? Where will data be stored? Who will have access to the data? What will you do with the data after the study?
- f. **Informed Consent Process:** Describe how you will inform participants about the purpose of the study, what they will be asked to do, that their participation is voluntary and they have the right to stop at any time.

## 2. Vertebrate animal research:

- a. Discuss potential ALTERNATIVES to vertebrate animal use and present justification for use of vertebrates.
- b. Explain potential impact or contribution of this research.
- c. Detail all procedures to be used, including methods used to minimize potential discomfort, distress, pain and injury to the animals and detailed chemical concentrations and drug dosages.
- d. Detail animal numbers, species, strain, sex, age, source, etc., include justification of the numbers planned.
- e. Describe housing and oversight of daily care
- f. Discuss disposition of the animals at the termination of the study.

## 3. Potentially hazardous biological agents research:

- a. Give source of the organism and describe BSL assessment process and BSL determination.
- b. Detail safety precautions and discuss methods of disposal.

## 4. Hazardous chemicals, activities & devices:

- Describe Risk Assessment process, supervision, safety precautions and methods of disposal.

# Approval Form (1B)

A completed form is required for each student, including all team members.

## 1. To Be Completed by Student and Parent

### a. Student Acknowledgment:

- I understand the risks and possible dangers to me of the proposed research plan.
- I have read the Intel ISEF Rules and Guidelines and will adhere to all International Rules when conducting this research.
- I have read and will abide by the following Ethics statement

**Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include but are not limited to plagiarism, forgery, use or presentation of other researcher's work as one's own, and fabrication of data. Fraudulent projects will fail to qualify for competition in affiliated fairs and the Intel ISEF.**

\_\_\_\_\_  
Student's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date Acknowledged (mm/dd/yy)  
(Must be prior to experimentation.)

**b. Parent/Guardian Approval:** I have read and understand the risks and possible dangers involved in the **Research Plan/Project Summary**. I consent to my child participating in this research.

\_\_\_\_\_  
Parent/Guardian's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date Acknowledged (mm/dd/yy)  
(Must be prior to experimentation.)

## 2. To be completed by the local or affiliated Fair SRC

(Required for projects requiring prior SRC/IRB APPROVAL. Sign 2a or 2b as appropriate.)

**a. Required for projects that need prior SRC/IRB approval BEFORE experimentation** (humans, vertebrates or potentially hazardous biological agents).

The SRC/IRB has carefully studied this project's **Research Plan/Project Summary** and all the required forms are included. My signature indicates approval of the **Research Plan/Project Summary** before the student begins experimentation.

\_\_\_\_\_  
SRC/IRB Chair's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Approval (mm/dd/yy)  
(Must be prior to experimentation.)

OR

**b. Required for research conducted at all Regulated Research Institutions with no prior fair SRC/IRB approval.**

This project was conducted at a regulated research institution (**not home or high school, etc.**), was reviewed and approved by the proper institutional board before experimentation and complies with the Intel ISEF Rules. **Attach (1C) and any required institutional approvals (e.g. IACUC, IRB).**

\_\_\_\_\_  
SRC Chair's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Approval (mm/dd/yy)

## 3. Final Intel ISEF Affiliated Fair SRC Approval (Required for ALL Projects)

### SRC Approval After Experimentation and Before Competition at Regional/State/National Fair

I certify that this project adheres to the approved **Research Plan/Project Summary** and complies with all Intel ISEF Rules.

\_\_\_\_\_  
Regional SRC Chair's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Approval

\_\_\_\_\_  
State/National SRC Chair's Printed Name  
(where applicable)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Approval

# Regulated Research Institutional/Industrial Setting Form (1C)

This form must be completed AFTER experimentation by the adult supervising the student research conducted in a regulated research institution, industrial setting or any work site other than home, school or field.

**To be completed by the Supervising Adult in the Setting (NOT the Student(s)) after experimentation:**  
(Responses must remain on the form as it is required to be displayed at student's project booth.)

The student(s) conducted research at my work site:

1. Did you or your proxy (e.g. graduate student, postdoc, employee) mentor or provide substantial guidance to the student researcher?  Yes  No
  - a. If no, describe your and/or your institution's role with the student researcher and his/her project (e.g. supervised use of equipment on site without ongoing mentorship and sign below.
  - b. If yes, complete questions 2–5.
2. Is the student's research project a subset of your ongoing research or work?  Yes  No  
Use questions 3, 4 and 5 to detail how the student's project was similar and/or different from ongoing research or work at your site.
3. Describe the independence and creativity with which the student:
  - a. developed the hypotheses or engineering goals for her/her research project
  - b. designed the methodology for his/her research project
  - c. analyzed and interpreted data
4. Detail the student's role in conducting the research (e.g. data collection, specific procedures performed). Differentiate what the student observed and what the student actually did.
5. Did the student(s) work on the project as part of a group?  Yes  No  
If yes, how many individuals were in the group and who were they (e.g. high school students, graduate students, faculty, professional researchers)?

I attest that the student has conducted the work as indicated above and that any required review and approval by institutional regulatory board (IRB/IACUC/IBC) has been obtained. Copies are attached if applicable.  
I further acknowledge that the student will be presenting this work publicly in competition and I have communicated with the student research regarding any requirements for my review and/or restrictions of what is publicized.

\_\_\_\_\_  
Supervising Adult's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Institution

\_\_\_\_\_  
Date Signed (must be after experimentation)

\_\_\_\_\_  
Address

\_\_\_\_\_  
Email/Phone

## Qualified Scientist Form (2)

May be required for research involving human participants, vertebrate animals, potentially hazardous biological agents, and DEA-controlled substances. Must be completed and signed before the start of student experimentation.

Student's Name(s) \_\_\_\_\_

Title of Project \_\_\_\_\_

### To be completed by the Qualified Scientist:

Scientist Name: \_\_\_\_\_

Educational Background: \_\_\_\_\_ Degree(s): \_\_\_\_\_

Experience/Training as relates to the student's area of research: \_\_\_\_\_

Position: \_\_\_\_\_

Institution: \_\_\_\_\_

Address: \_\_\_\_\_

Email/Phone: \_\_\_\_\_

- 1) Have you reviewed the Intel ISEF rules relevant to this project?  Yes  No
2. Will any of the following be used?
- a. Human participants  Yes  No
  - b. Vertebrate animals  Yes  No
  - c. Potentially hazardous biological agents (microorganisms, rDNA and tissues, including blood and blood products)  Yes  No
  - d. DEA-controlled substances  Yes  No
3. Was this study a sub-set of a larger study?  Yes  No
4. Will you directly supervise the student?  Yes  No
- a. If no, who will directly supervise and serve as the Designated Supervisor? \_\_\_\_\_
  - b. Experience/Training of the Designated Supervisor: \_\_\_\_\_

### To be completed by the Qualified Scientist:

I certify that I have reviewed and approved the Research Plan/Project Summary prior to the start of the experimentation. If the student or Designated Supervisor is not trained in the necessary procedures, I will ensure her/his training. I will provide advice and supervision during the research. I have a working knowledge of the techniques to be used by the student in the Research Plan/Project Summary. I understand that a Designated Supervisor is required when the student is not conducting experimentation under my direct supervision.

\_\_\_\_\_  
Qualified Scientist's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Approval

### To be completed by the Designated Supervisor when the Qualified Scientist cannot directly supervise.

I certify that I have reviewed the Research Plan/Project Summary and have been trained in the techniques to be used by this student, and I will provide direct supervision.

\_\_\_\_\_  
Designated Supervisor's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Approval

\_\_\_\_\_  
Phone

\_\_\_\_\_  
Email

## Risk Assessment Form (3)

Required for projects using hazardous chemicals, activities or devices and microorganisms which are exempt from pre-approval. Must be completed before experimentation.

Student's Name(s) \_\_\_\_\_

Title of Project \_\_\_\_\_

**To be completed by the Student Researcher(s) in collaboration with Designated Supervisor/Qualified Scientist:** (All questions must be answered; additional page(s) may be attached.)

1. List all hazardous chemicals, activities, or devices that will be used; identify microorganisms exempt from pre-approval (see Potentially Hazardous Biological Agent rules).
2. Identify and assess the risks involved in this project.
3. Describe the safety precautions and procedures that will be used to reduce the risks.
4. Describe the disposal procedures that will be used (when applicable).
5. List the source(s) of safety information.

**To be completed and signed by the Designated Supervisor (or Qualified Scientist, when applicable):**

I agree with the risk assessment and safety precautions and procedures described above. I certify that I have reviewed the Research Plan/Project Summary and will provide direct supervision.

\_\_\_\_\_  
Designated Supervisor's Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Review (mm/dd/yy)

\_\_\_\_\_  
Position & Institution

\_\_\_\_\_  
Phone or email contact information

\_\_\_\_\_  
Experience/Training as relates to the student's area of research

## Human Participants Form (4)

Required for all research involving human participants not at a Regulated Research Institution. If at a Regulated Research Institution, use institutional approval forms for documentation of prior review and approval.  
(IRB approval required before experimentation.)

Student's Name(s)	Title of Project
Adult Sponsor	Phone/Email
<b>Must be completed by Student Researcher(s) in collaboration with the Adult Sponsor/Designated Supervisor/Qualified Scientist:</b>	
1. <input type="checkbox"/> I have submitted my Research Plan/Project Summary which addresses ALL areas indicated in the Human Participants Section of the Research Plan/Project Summary Instructions.	
2. <input type="checkbox"/> I have attached any surveys or questionnaires I will be using in my project or other documents provided to human participants. <input type="checkbox"/> Any published instrument(s) used was /were legally obtained.	
3. <input type="checkbox"/> I have attached an informed consent that I would use if required by the IRB.	
4. <input type="checkbox"/> Yes <input type="checkbox"/> No    Are you working with a Qualified Scientist? If yes, attach the Qualified Scientist Form 2.	

### BELOW - IRB USE ONLY

**Must be completed by Institutional Review Board (IRB) after review of the research plan. All questions must be answered for the approval to be valid. (If not approved, return paperwork to the student with instructions for modifications.)**

Approved with Full Committee Review (3 signatures required) and the following conditions: (All 6 must be answered)

1. Risk Level (check one):                       Minimal Risk                       More than Minimal Risk
2. Qualified Scientist (QS) Required:                       Yes                       No
3. Designated Supervisor (DS) Required:                       Yes                       No
4. Written Minor Assent required for minor participants:
  - Yes                       No                       Not applicable (No minors in this study)
5. Written Parental Permission required for minor participants:
  - Yes                       No                       Not applicable (No minors in this study)
6. Written Informed Consent required for participants 18 years or older:
  - Yes                       No                       Not applicable (No participants 18 yrs or older in this study)

Approved with Expedited Review (1 signature required). Study involves either of the following:

- Human participants will only provide feedback on project design/student-designed invention or prototype. etc., no personal data will be collected and there are no health or safety hazards.
- Student is the only subject of the research and no more than minimal risk is involved.

**IRB SIGNATURES (All 3 signatures required unless expedited review checked above)** None of these individuals may be the adult sponsor, designated supervisor, qualified scientist or related to (e.g., mother, father of) the student (conflict of interest).

**I attest that I have reviewed the student's project, that the checkboxes above have been completed to indicate the IRB determination and that I agree with the decisions above.**

**Medical or Mental Health Professional (a psychologist, medical doctor, licensed social worker, licensed clinical professional counselor, physician's assistant, or registered nurse)** with expertise related to this project.

Printed Name	Degree/Professional License
Signature	Date of Approval (Must be prior to experimentation.)

**Educator**

Printed Name	Degree
Signature	Date of Approval (Must be prior to experimentation.)

**School Administrator**

Printed Name	Degree/Professional License
Signature	Date of Approval (Must be prior to experimentation.)

# Human Informed Consent Form

**Instructions to the Student Researcher(s):** An informed consent/assent/permission form should be developed in consultation with the Adult Sponsor, Designated Supervisor or Qualified Scientist. This form is used to provide information to the research participant (or parent/guardian) and to document written informed consent, minor assent, and/or parental permission.

- When written documentation is required, the researcher keeps the original, signed form.
- Students may use this sample form or may copy ALL elements of it into a new document.

If the form is serving to document parental permission, a copy of any survey or questionnaire must be attached.

Student Researcher(s): \_\_\_\_\_

Title of Project: \_\_\_\_\_

I am asking for your voluntary participation in my science fair project. Please read the following information about the project. If you would like to participate, please sign in the appropriate area below.

Purpose of the project:

If you participate, you will be asked to:

Time required for participation:

Potential Risks of Study:

Benefits:

How confidentiality will be maintained:

If you have any questions about this study, feel free to contact:

Adult Sponsor/QS/DS: \_\_\_\_\_ Phone/email: \_\_\_\_\_

## Voluntary Participation:

Participation in this study is completely voluntary. If you decide not to participate there will not be any negative consequences. Please be aware that if you decide to participate, you may stop participating at any time and you may decide not to answer any specific question.

By signing this form I am attesting that I have read and understand the information above and I freely give my consent/assent to participate or permission for my child to participate.

**Adult Informed Consent or Minor Assent** Date Reviewed & Signed: \_\_\_\_\_

\_\_\_\_\_  
Research Participant Printed Name: Signature:

**Parental/Guardian Permission** (if applicable) Date Reviewed & Signed: \_\_\_\_\_

\_\_\_\_\_  
Parent/Guardian Printed Name: Signature:



# Vertebrate Animal Form (5A)

**Required for all research involving vertebrate animals that is conducted in a school/home/field research site.  
(SRC approval required before experimentation.)**

Student's Name(s) \_\_\_\_\_

Title of Project \_\_\_\_\_

### To be completed by Student Researcher:

1. Common name (or Genus, species) and number of animals used.
2. Describe completely the housing and husbandry to be provided. Include the cage/pen size, number of animals per cage, environment, bedding, type of food, frequency of food and water, how often animal is observed, etc. Add an additional page as necessary.
3. What will happen to the animals after experimentation?
4. Attach a copy of wildlife licenses or approval forms, as applicable
5. The Intel ISEF Vertebrate Animal Rules require that any death, illness or unexpected weight loss be investigated and documented by a letter from the qualified scientist, designated supervisor or a veterinarian. If applicable, attach this letter with this form when submitting your paperwork to the SRC prior to competition.

### To be completed by Local or Affiliate Fair Scientific Review Committee (SRC) BEFORE experimentation.

#### Level of Supervision Required for agricultural, behavioral or nutritional studies:

- Designated Supervisor REQUIRED. Please have applicable person sign below.
- Veterinarian and Designated Supervisor REQUIRED. Please have applicable persons sign below.
- Veterinarian, Designated Supervisor and Qualified Scientist REQUIRED. Please have applicable persons sign below and have the Qualified Scientist complete Form (2).

The SRC has carefully reviewed this study and finds it is an appropriate study that may be conducted in a non-regulated research site.

#### Local or Affiliate Fair SRC Pre-Approval Signature:

SRC Chair Printed Name	Signature	Date of Approval (must be prior to experimentation) (mm/dd/yy)

#### To be completed by Veterinarian:

- I have reviewed this research and animal husbandry with the student before the start of experimentation.
- I have approved the use and dosages of prescription drugs and/or nutritional supplements.
- I will provide veterinary medical and nursing care in case of illness or emergency.

Printed Name	Email/Phone
Signature	Date of Approval

#### To be completed by Designated Supervisor or Qualified Scientist when applicable:

- I have reviewed this research and animal husbandry with the student before the start of experimentation and I accept primary responsibility for the care and handling of the animals in this project.
- I will directly supervise the experiment.

Printed Name	Email/Phone
Signature	Date of Approval

## Vertebrate Animal Form (5B)

**Required for all research involving vertebrate animals that is conducted in at a Regulated Research Institution. (IACUC approval required before experimentation. Form must be completed and signed after experimentation.)**

Student's Name(s) \_\_\_\_\_

Title of Project \_\_\_\_\_

Title and Protocol Number of IACUC Approved Project \_\_\_\_\_

**To be completed by Qualified Scientist or Principal Investigator:**

1. Species of animals used: \_\_\_\_\_ Number of animals used: \_\_\_\_\_

2. Describe, in detail, the role of the student in this project: animal procedures and related equipment that were involved, oversight provided and safety precautions employed. (Attach extra pages if necessary.)

3. Was there any weight loss or death of any animal? If yes, attach a letter obtained from the qualified scientist, designated supervisor or a veterinarian documenting the situation and the results of the investigation.

4. Did the student's project also involve the use of tissues?

- No
- Yes; complete Forms 6A and 6B

5. What laboratory training, including dates, was provided to the student?

**6. Attach a copy of the Regulated Research Institution IACUC Approval.** A letter from the Qualified Scientist or Principal Investigator is not sufficient.

**Qualified Scientist/Principal Investigator**

Printed Name \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

# Potentially Hazardous Biological Agents Risk Assessment Form (6A)

Required for research involving microorganisms, rDNA, fresh/frozen tissue (including primary cell lines, human and other primate established cell lines and tissue cultures), blood, blood products and body fluids.  
SRC/IACUC/IBC approval required before experimentation.

Student's Name(s) \_\_\_\_\_

Title of Project \_\_\_\_\_

**To be completed by the QUALIFIED SCIENTIST/DESIGNATED SUPERVISOR in collaboration with the student researcher(s). All questions are applicable and must be answered; additional page(s) may be attached.**

## SECTION 1: PROJECT ASSESSMENT

1. Identify potentially hazardous biological agents to be used in this experiment. Include the source, quantity and the biosafety level risk group of each microorganism.
2. Describe the site of experimentation including the level of biological containment.
3. Describe the procedures that will be used to minimize risk (personal protective equipment, hood type, etc.).
4. What final biosafety level do you recommend for this project given the risk assessment you conducted?
5. Describe the method of disposal of all cultured materials and other potentially hazardous biological agents.

## SECTION 2: TRAINING

1. What training will the student receive for this project?
2. Experience/training of Designated Supervisor as it relates to the student's area of research (if applicable).

## SECTION 3: For ALL CELL LINES and MICROORGANISMS – To be completed by the QUALIFIED SCIENTIST or DESIGNATED SUPERVISOR - Check the appropriate box(es) below:

- Experimentation on the cell line/microorganism used in this study was not conducted at a Regulated Research Institution, but was conducted at a (check one) \_\_\_ BSL-1 or \_\_\_ BSL-2 laboratory. This study has been reviewed by the local SRC and the procedures have been approved prior to experimentation.
- Experimentation on the cell line/microorganism used in this study was conducted at a Regulated Research Institution and was approved by the appropriate institutional board prior to experimentation; institutional approval forms are attached.  
Origin of cell lines: \_\_\_\_\_ Date of IACUC/IBC approval (mm/dd/yy) \_\_\_\_\_
- Experimentation on the cell line/microorganism used in this study was conducted at a Regulated Research Institution, which does not require pre-approval for this type of study. The SRC has reviewed that the student received appropriate training and the project complies with Intel ISEF rules.

## CERTIFICATION – To be SIGNED by the QUALIFIED SCIENTIST or DESIGNATED SUPERVISOR

The QS/DS has seen this project's research plan and supporting documentation and acknowledges the accuracy of the information provided above. This study has been approved as a (check one)  BSL-1/  BSL-2 study, and will be conducted in an appropriate laboratory.

\_\_\_\_\_  
QS/DS Printed Name

\_\_\_\_\_  
Signature

## SECTION 4: CERTIFICATION – To be completed by the LOCAL or AFFILIATED FAIR SRC

The SRC has seen this project's research plan and supporting documentation and acknowledges the accuracy of the information provided above.

\_\_\_\_\_  
SRC Printed Name

\_\_\_\_\_  
Signature

## Human and Vertebrate Animal Tissue Form (6B)

Required for research involving fresh/frozen tissue (including primary cell lines, human and other primate established cell lines and tissue cultures), blood, blood products and body fluids. If the research involves living organisms please ensure that the proper human or animal forms are completed. **All projects using any tissue listed above must also complete Form 6A.**

Student's Name(s) \_\_\_\_\_

Title of Project \_\_\_\_\_

### To be completed by Student Researcher(s):

1. What vertebrate animal tissue will be used in this study? Check all that apply.
  - Fresh or frozen tissue sample
  - Fresh organ or other body part
  - Blood
  - Body fluids
  - Primary cell/tissue cultures
  - Human or other primate established cell lines
2. Where will the above tissue(s) be obtained. If using an established cell line include source and catalog number.
3. If the tissue will be obtained from a vertebrate animal study conducted at a research institution attach a copy of the IACUC certification with the name of the research institution, the title of the study, the IACUC approval number and date of IACUC approval.

### To be completed by the Qualified Scientist or Designated Supervisor:

- I verify that the student will work solely with organs, tissues, cultures or cells that will be supplied to him/her by myself or qualified personnel from the laboratory; and that if vertebrate animals were euthanized they were euthanized for a purpose other than the student's research.
- AND/OR**
- I certify that the blood, blood products, tissues or body fluids in this project will be handled in accordance with the standards and guidance set forth in Occupational Safety and Health Act, 29CFR, Subpart Z, 1910.1030 - Blood Borne Pathogens.

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Approval  
(Must be prior to experimentation.)

\_\_\_\_\_  
Title

\_\_\_\_\_  
Phone/Email

\_\_\_\_\_  
Institution

## Continuation/Research Progression Projects Form (7)

Required for projects that are a continuation/progression in the same field of study as a previous project.  
*This form must be accompanied by the previous year's abstract and Research Plan/Project Summary.*

Student's Name(s) \_\_\_\_\_

**To be completed by Student Researcher:**

List all components of the current project that make it new and different from previous research. The information must be on the form; use an additional form for 2013–2014 and earlier projects.

Components	Current Research Project	Previous Research Project
1. Title		2015–2016  2014–2015
2. Change in goal/purpose/objective		2015–2016  2014–2015
3. Changes in methodology		2015–2016  2014–2015
4. Variables studied		2015–2016  2014–2015
5. Additional changes		2015–2016  2014–2015

Attached are:

- 2015–2016 Abstract and Research Plan/Project Summary       2014–2015 Abstract

I hereby certify that the above information is correct and that the current year Abstract & Certification and project display board properly reflect work done only in the current year.

\_\_\_\_\_  
 Student's Printed Name(s)      Signature      Date of Signature

The Intel International Science and Engineering Fair encourages students to tackle challenging scientific questions and develop the skills needed to solve the problems of tomorrow.

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