

# 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 [www.societyforscience.org/isef/students/project\\_categories](http://www.societyforscience.org/isef/students/project_categories) for a full description and definition of the Intel ISEF categories:

## **ANIMAL SCIENCES**

Animal Husbandry  
Development  
Ecology  
Pathology  
Physiology  
Populations Genetics  
Systematics  
Other

## **BEHAVIORAL & SOCIAL SCIENCES**

Clinical & Developmental Psychology  
Cognitive Psychology  
Physiological Psychology  
Sociology  
Other

## **BIOCHEMISTRY**

General Biochemistry  
Metabolism  
Structural Biochemistry  
Other

## **CELLULAR AND MOLECULAR BIOLOGY**

Cellular Biology  
Cellular and Molecular Genetics  
Immunology  
Molecular Biology  
Other

## **CHEMISTRY**

Analytical Chemistry  
General Chemistry  
Inorganic Chemistry  
Organic Chemistry  
Physical Chemistry  
Other

## **COMPUTER SCIENCE**

Algorithms, Data Bases  
Artificial Intelligence  
Networking and Communications  
Computational Science, Computer Graphics  
Computer System, Operating System  
Software Engineering, Programming Languages  
Other

## **EARTH & PLANETARY SCIENCE**

Climatology, Weather  
Geochemistry, Mineralogy  
Paleontology  
Geophysics  
Planetary Science  
Tectonics  
Other

## **ENGINEERING: Electrical & Mechanical**

Electrical Engineering, Computer Engineering, Controls  
Mechanical Engineering, Robotics  
Thermodynamics, Solar  
Other

## **ENGINEERING: Materials & Bioengineering**

Bioengineering  
Chemical Engineering  
Civil Engineering, Construction Eng.  
Industrial Engineering, Processing  
Material Science  
Other

## **ENERGY & TRANSPORTATION**

Aerospace and Aeronautical Engineering, Aerodynamics  
Alternative Fuels  
Fossil Fuel Energy  
Vehicle Development  
Renewable Energies  
Other

## **ENVIRONMENTAL MANAGEMENT**

Bioremediation  
Ecosystems Management  
Environmental Engineering  
Land Resource Management, Forestry  
Recycling, Waste Management  
Other

## **ENVIRONMENTAL SCIENCES**

Air Pollution and Air Quality  
Soil Contamination and Soil Quality  
Water Pollution and Water Quality  
Other

## **MATHEMATICAL SCIENCES**

Algebra  
Analysis  
Applied Mathematics  
Geometry  
Probability and Statistics  
Other

## **MEDICINE & HEALTH SCIENCES**

Disease Diagnosis and Treatment  
Epidemiology  
Genetics  
Molecular Biology of Diseases  
Physiology and Pathophysiology  
Other

## **MICROBIOLOGY**

Antibiotics, Antimicrobials  
Bacteriology  
Microbial Genetics  
Virology  
Other

## **PHYSICS AND ASTRONOMY**

Astronomy  
Atoms, Molecules, Solids  
Biological Physics  
Instrumentation and Electronics  
Magnetics and Electromagnetics  
Nuclear and Particle Physics  
Optics, Lasers, Masers  
Theoretical Physics, Theoretical or Computational Astronomy  
Other

## **PLANT SCIENCES**

Agriculture/Agronomy  
Development  
Ecology  
Genetics  
Photosynthesis  
Plant Physiology (Molecular, Cellular, Organismal)  
Plant Systematics, Evolution  
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.
- 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
  - Vertebrate Animals
  - Potentially Hazardous Biological Agents
    - Microorganisms
    - rDNA
    - Tissues
- 5)  Items to be completed for ALL PROJECTS
  - Adult Sponsor Checklist (1)
  - Student Checklist (1A)
  - Regulated Research Institutional/Industrial Setting Form (1C) (when applicable after completed experiment)
  - Continuation Form (7) (when applicable)
  - Research Plan
  - Approval Form (1B)

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.)
  - 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)
  - Risk Assessment Form (3) Required for projects involving protists, archae and similar microorganisms and for projects using manure for composting, fuel production or other non-culturing experiments (6A, 6B and 2 are not required)
- Hazardous Chemicals, Activities and Devices** (No 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)

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

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

## Ethics Statement

Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include 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.

## Eligibility/Limitations

- 1) Each ISEF-affiliated fair may send the number of projects provided by their affiliation agreement.
- 2) A student must be selected by an ISEF-affiliated fair and be in grades 9-12 or equivalent to be eligible, none of whom has reached age 21 on or before May 1 preceding the Intel ISEF.
- 3) Each student may enter only one project which covers research done over a maximum of 12 continuous months between January 2011 and May 2012.
- 4) Team projects may have a maximum of three members. Teams may not have more than 3 members at a local fair and then eliminate members at regional, state or international competition.
- 5) Students may compete in only one ISEF Affiliated Fair, except when proceeding to a state/national fair affiliated with the Intel ISEF from an affiliated regional fair.
- 6) Projects that are demonstrations, 'library' research or informational projects, 'explanation' models or kit building are not appropriate for the Intel ISEF.
- 7) There is a broad range of categories in which students can complete science fair projects. A list of the Intel ISEF categories and subcategories with definitions can be found at [www.societyforscience.org/isef/project\\_categories](http://www.societyforscience.org/isef/project_categories).
- 8) A research project may be a part of a larger study done by professional scientists, but the project presented by the student must only be their portion of the complete study.

## Requirements

### General

- 1) All domestic and international students competing in an ISEF-affiliated fair must adhere to all of the rules as set forth in this document.
- 2) All projects must adhere to the Ethics Statement above.
- 3) Projects must adhere to local, state, country and U.S. Federal laws, regulations and permitting conditions.
- 4) The use of non-animal research methods and the use of alternatives to animal research are strongly encouraged and must be explored before conducting a vertebrate animal project.

- 5) Introduction or disposal of non-native species, pathogens, toxic chemicals or foreign substances into the environment is prohibited. See [www.anstaskforce.gov/documents/isef.pdf](http://www.anstaskforce.gov/documents/isef.pdf).
- 6) Intel ISEF exhibits must adhere to Intel ISEF display and safety requirements.
- 7) **It is the responsibility of the student and adult sponsor to check with their affiliated fair for any additional restrictions or requirements.**

### Approval and Documentation

- 8) Before experimentation begins, a local or regional Institutional Review Board (IRB) or Scientific Review Committee (SRC) associated with your fair must review and approve most projects involving human participants, vertebrate animals, and potentially hazardous biological agents. See the appropriate sections of the Rules Book.
- 9) Every student must complete **Student Checklist (1A)**, a **Research Plan and Approval Form (1B)** and review the project with the Adult Sponsor as the **Checklist for Adult Sponsor (1)** is completed.
- 10) A Qualified Scientist is required for all studies involving BSL-2 potentially hazardous biological agents, DEA-controlled substances, many human participant studies and many vertebrate animal studies.
- 11) After initial IRB/SRC approval (if required), any proposed changes in the **Student Checklist (1A)** and **Research Plan** must be re-approved before laboratory experimentation/data collection resumes.
- 12) Projects which are continuations of previous year's work and which require IRB/SRC approval must be reapproved prior to experimentation/data collection for the current year.
- 13) Any continuing project must document that the additional research is new and different. (See **Continuation Projects Form (7)**)
- 14) 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 ISEF project year, **Regulated Research Institutional/Industrial Setting Form (1C)** must be completed and displayed at the project booth.
- 15) 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 adult supervisors.
- 16) A project data book and research paper are not required, but are recommended. (See *Student Handbook*; Regional fairs may have different requirements).
- 17) All signed forms, certifications, and permits must be available for review by a SRC just before each fair a student enters.

## Continuation of Projects

- 1) As in the professional world, research projects may be done that build on work done in previous years. A valid continuation project is a sound scientific endeavor. Students will be judged **only** on the most recent year's research. The project year includes research conducted over a maximum of 12 continuous months from January 2011 – May 2012.
- 2) Any project based on the student's prior research could be considered a continuation project. If the current year's project could not have been done without what was learned from the past year's research, then it is a continuation project for competition. These projects must document that the additional research is an expansion from prior work (e.g. testing a new variable or new line of investigation, etc.) Repetition of previous experimentation with the exact same methodology and research question or increasing sample size are examples of unacceptable continuations.
- 3) Display boards and the 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"). Supporting data books (not research papers) from previous related research may be exhibited on the table 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 continuation projects must be reviewed and approved each year and forms must be completed for the new year.

NOTE: For competition in the Intel ISEF, documentation must include the **Continuation Project Form (7)**, the **previous year's abstract and research plan** and the abstract for all other prior years. The documentation should be clearly labeled with the year (ex: 2010-2011). Please retain all prior years' paperwork in case a SRC requests additional documentation.

## Team Projects

- 1) At the Intel ISEF, team projects will compete within the scientific category of their research and will no longer be a separate judged category.
- 2) Teams may have up to three members. Teams may not have more than three members at a local fair and then eliminate members to qualify for the Intel ISEF.

- 3) Team membership cannot be changed during a given research year including converting from an individual project or vice versa. In future years, the project may be converted from an individual to a team project, from a team to an individual project or have a change of team members.
- 4) Each team should 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 similar rules and judging criteria as individual projects.
- 5) Each team member must submit an **Approval Form (1B)**. However, team members must jointly submit the **Checklist for Adult Sponsor (1)**, one abstract, a **Student Checklist (1A)**, a **Research Plan** and other required forms.
- 6) Full names of all team members must appear on the abstract and forms.

## Roles and Responsibilities of Students and Adults

### 1) The Student Researcher(s)

The student researcher is responsible for all aspects of the research project including enlisting the aid of any needed supervisory adults (Adult Sponsor, Qualified Scientist, etc.), obtaining necessary approvals (SRC, IRB, etc.), following the Rules & Guidelines of the ISEF, and doing the experimentation, engineering, data analysis, etc. involved in the project.

**Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include 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 or the Intel ISEF.**

### 2) The Adult Sponsor

An Adult Sponsor may be a teacher, parent, university professor, or scientist in whose lab the student is working. This individual must have a solid background in science and should have close contact with the student during the course of the project.

The Adult Sponsor is responsible for working with the student to evaluate any possible risks involved in order to ensure the health and safety of the student conducting the research and the humans or animals involved in the study. The Adult Sponsor must review the student's **Student Checklist (1A)** and **Research Plan** to make sure that: a) experimentation is done within local, state, and federal laws and these International Rules; b) that forms are completed by other adults involved in approving or supervising any part of the experiment; and c) that criteria for the Qualified Scientist adhere to those set forth below.

The sponsor must be familiar with the regulations that govern potentially dangerous research as they apply to a specific student project. These may include chemical and equipment usage, experimental techniques, research involving human or vertebrate animals, and cell cultures, microorganisms, or animal tissues. The issues must be discussed with the student when completing the **Research Plan**. Some experiments involve procedures or materials that are regulated by state and federal laws. If not thoroughly familiar with the regulations, the Adult Sponsor should help the student enlist the aid of a Qualified Scientist.

The Adult Sponsor is responsible for ensuring the student's research is eligible for entry in the Intel ISEF.

### 3) The Qualified Scientist

A Qualified Scientist should possess an earned doctoral/professional degree in the biological or medical sciences as it relates to the student's area of research. However, a master's degree with equivalent experience and/or expertise in the student's area of research is acceptable when approved by a Scientific Review Committee (SRC). The Qualified Scientist must be thoroughly familiar with the local, state, and federal regulations that govern the student's area of research.

The Qualified Scientist and the Adult Sponsor may be the same person, if that person is qualified as outlined above. A student may work with a Qualified Scientist in another city or state. In this case, the student must work locally with a Designated Supervisor (see below) who has been trained in the techniques the student will use.

### 4) The Designated Supervisor

The Designated Supervisor is an adult who is directly responsible for overseeing student experimentation. The Designated Supervisor need not have an advanced degree, but should be thoroughly familiar with the student's project, and must be trained in the student's area of research. The Adult Sponsor may act as the Designated Supervisor.

If a student is experimenting with live vertebrates and the animals are in a situation where their behavior or habitat is influenced by humans, the Designated Supervisor must be knowledgeable about the humane care and handling of the animals.

### 5) The Institutional Review Board (IRB)

An Institutional Review Board (IRB) is a committee that, according to federal regulations (45-CFR-46), must evaluate the potential physical and/or psychological risk of research involving humans. All proposed human research must be reviewed and approved by an IRB before experimentation begins. This includes review of any surveys or questionnaires to be used in a project.

Federal regulations require local community involvement, therefore an IRB should be established at the school level to evaluate human research projects. An IRB at the school or ISEF Affiliated Fair level must consist of a minimum of three members.

All IRB must include:

- a) an educator
- b) a school administrator (preferably, a principal or vice principal),
- c) and one of the following who is knowledgeable and capable of evaluating the physical and/or psychological risk involved in a given study: a medical doctor, physician's assistant, registered nurse, a psychiatrist, psychologist, licensed social worker or licensed clinical professional counselor.

**Additional Expertise:** If the IRB needs an expert as one of its members and one is not in the immediate area, then documented contact with an external expert is appropriate and encouraged. A copy of the correspondence (e.g. email, fax, etc.) should be attached to Form 4 and can be used as the signature of that expert.

**In order to eliminate conflict of interest, the Adult Sponsor, parents, the Qualified Scientist, and the Designated Supervisor who oversee a specific project must not serve on the IRB reviewing that project.** Additional members are recommended to help avoid this conflict of interest and to increase the expertise of the committee.

IRBs exist at federally regulated institutions (e.g., universities, medical centers, NIH, correctional facilities). Prisoner advocates must be included on the IRB when research subjects are at a correctional facility. The institutional IRB must initially review and approve all proposed research conducted at or sponsored by that institution. The Adult Sponsor and the local IRB are responsible for ensuring that the project is appropriate for a pre-college student and adheres to the ISEF rules.

An IRB generally makes the final determination of risk. However, in reviewing projects just prior to a fair, if a SRC judges an IRB's decision as inappropriate, thereby placing human subjects in jeopardy, the SRC may override the IRB's decision and the project may fail to qualify for competition.

### 6) The Affiliated Fair Scientific Review Committee

A Scientific Review Committee (SRC) is a group of qualified individuals that is responsible for evaluation of student research, certifications, research plans and exhibits for compliance with the Rules and pertinent laws and regulations. Local SRCs may be formed to assist the Affiliated Fair SRC in reviewing and approving projects. The operation and composition of the local and Affiliated Fair SRCs must fully comply with the International Rules. Contact your fair for information on how to receive pre-approval. (An online listing of fairs is available at: [http://apps.societyforscience.org/isef/find\\_a\\_fair](http://apps.societyforscience.org/isef/find_a_fair).)

Any proposed research in the following areas must be reviewed and approved **BEFORE** experimentation: projects involving vertebrate animals and potentially hazardous biological agents. (Human studies reviewed and approved by a properly constituted IRB do not have to be reviewed by the SRC until just prior to the Fair competition.)

After experimentation and shortly before competition in an Affiliated Fair competition. (Projects requiring preapproval which were conducted at a regulated research institution (not home or high school, etc.) and which were reviewed and approved by the proper institutional board before experimentation must also be reviewed by the Fair SRC for rules compliance.)

A SRC must consist of a minimum of three persons. The SRC must include:

- a) a biomedical scientist (earned doctoral degree, such as Ph.D., M.D., D.V.M., D.D.S., or D.O.)
- b) an educator
- c) at least one other member

**Additional Expertise:** Many projects will require additional expertise to properly evaluate (for instance, extended knowledge of biosafety or of human risk groups.) If animal research is involved, at least one member must be familiar with proper animal care procedures. Depending on the nature of the study, this person can be a veterinarian or animal care provider with training and/or experience in the species being studied. If the SRC needs an expert as one of its members and one is not in the immediate area, then documented contact with an external expert is appropriate and encouraged.

**In order to eliminate conflict of interest, the Adult Sponsor, parents, the Qualified Scientist, and the Designated Supervisor must not serve on the SRC reviewing that project.** Additional members are recommended to help avoid this conflict of interest and to increase the expertise of the committee.

A Scientific Review Committee (SRC) examines projects for the following:

- a) evidence of literature search
- b) evidence of proper supervision
- c) use of accepted and appropriate research techniques
- d) completed forms, signatures and dates showing maximum of one year duration of research and appropriate preapproval dates (when needed)
- e) evidence of search for alternatives to animal use
- f) humane treatment of animals
- g) compliance with rules and laws governing human, animal research and those involving potentially hazardous biological agents
- i) documentation of substantial expansion for continuation projects
- j) compliance with the ISEF ethics statement

## 7) Other Review Committees

Certain areas of research conducted in a regulated research institution require review and approval by federally mandated committees that have been established at that institution. These committees include:

- a) Institutional Animal Care and Use Committee (IACUC)
- b) Institutional Review Board (IRB)
- c) Institutional Biosafety Committee (IBC)
- d) Embryonic Stem Cell Research Oversight Committee (ESCRO)

## 8) The Intel ISEF Scientific Review Committee (Intel ISEF SRC)

A Scientific Review Committee exists at the Intel ISEF level. The ISEF SRC reviews the forms and the research plan for all projects at the Intel ISEF to ensure that students have followed all applicable Rules.

The Intel ISEF SRC, like an Affiliated Fair SRC, is made up of a group of adults knowledgeable about research regulations. The Intel ISEF SRC reviews the **Checklist for Adult Sponsor (1), Abstract, Student Checklist (1A), Research Plan and Approval Form (1B)** in addition to all other required forms for students who enter the Intel ISEF. They also identify problems local fairs may be having and work with fair directors and teachers to resolve them.

A fair director or Affiliated Fair SRC member with any questions regarding the process, should contact the Society for Science & the Public or a member of the Intel ISEF SRC.

The Intel ISEF SRC is the final authority on projects that are qualified to compete in the Intel ISEF. In some cases, the Intel ISEF SRC may have questions about particular projects. Usually, after students explain their procedures and research to the Intel ISEF SRC, a simple corrective measure is prescribed (e.g., contacting the Designated Supervisor to confirm a detail, or rewriting an abstract for purposes of clarification).

# 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) Is this a continuation from a previous year?  Yes  No

If Yes:

a) Attach the previous year's  Abstract and  Research Plan

b) Explain how this project is new and different from previous years on  Continuation Form (7)

6) This year's laboratory experiment/data collection: (must be stated (mm/dd/yy))

Start Date: \_\_\_\_\_ End Date: \_\_\_\_\_

7) Where will you conduct your experimentation? (check all that apply)

Research Institution  School  Field  Home  Other: \_\_\_\_\_

8) List name and address of all non-school work site(s):

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

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

Phone: \_\_\_\_\_

9) Complete a Research Plan following the Research Plan instructions and attach to this form.

10) An abstract is required for all projects after experimentation.

Provide a typed research plan and attach to Student Checklist (1A). Please include your name on each page.

The research plan for ALL projects is to include the following:

- A. **Question or Problem** being addressed
- B. **Goals/Expected Outcomes/Hypotheses**
- C. **Description in detail of method or procedures** (The following are important and key items that should be included when formulating ANY AND ALL research plans.)
  - **Procedures:** Detail all procedures and experimental design to be used for data collection
  - **Data Analysis:** Describe the procedures you will use to analyze the data that answer research question or hypothesis
- D. **Bibliography:** List at least five (5) 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.
  - Choose one style and use it consistently to reference the literature used in the research plan
  - Guidelines can be found in the Student Handbook

Items 1-4 below are subject-specific guidelines for additional items to be included in your research plan as applicable:

**1. Human participants research:**

- **Participants.** Describe who will participate in your study (age range, gender, racial/ethnic composition). Identify any vulnerable populations (minors, pregnant women, prisoners, mentally disabled or economically disadvantaged).
- **Recruitment.** Where will you find your participants? How will they be invited to participate?
- **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?
- **Risk Assessment**
  - **Risks.** What are the risks or potential discomforts (physical, psychological, time involved, social, legal etc) to participants? How will you minimize the risks?
  - **Benefits.** List any benefits to society or each participant.
- **Protection of Privacy.** Will any identifiable information (e.g., names, telephone numbers, birthdates, email addresses) be collected? Will data be confidential or anonymous? If anonymous, describe how the data will be collected anonymously. If not anonymous, what procedures are in place for safeguarding confidentiality? Where will the data be stored? Who will have access to the data? What will you do with the data at the end of the study?
- **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:**

- Briefly discuss potential **ALTERNATIVES** to vertebrate animal use and present a detailed justification for use of vertebrate animals
- Explain potential impact or contribution this research may have
- Detail all procedures to be used
  - Include methods used to minimize potential discomfort, distress, pain and injury to the animals during the course of experimentation
  - Detailed chemical concentrations and drug dosages
- Detail animal numbers, species, strain, sex, age, source, etc.
  - Include justification of the numbers planned for the research
- Describe housing and oversight of daily care
- Discuss disposition of the animals at the termination of the study

**3. Potentially Hazardous Biological Agents:**

- Describe Biosafety Level Assessment process and resultant BSL determination
- Give source of agent, source of specific cell line, etc.
- Detail safety precautions
- Discuss methods of disposal

**4. Hazardous Chemicals, Activities & Devices:**

- Describe Risk Assessment process and results
- Detail chemical concentrations and drug dosages
- Describe safety precautions and procedures to minimize risk
- Discuss 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 the 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 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

(Must be prior to experimentation.)

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

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

\_\_\_\_\_  
Signature

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

(Must be prior to experimentation.)

## 2) To be completed by the 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** and all the required forms are included. My signature indicates approval of the **Research Plan** before the student begins experimentation.

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

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Approval  
(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 required institutional approvals (e.g. IACUC, IRB)**

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

\_\_\_\_\_  
Signature

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

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

**SRC Approval After Experimentation and Shortly Before Competition at Regional/State/National Fair**  
I certify that this project adheres to the approved **Research Plan** 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

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.

This form MUST be displayed with your project; Responses must be on the form.

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

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

**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:

a)  to use the equipment      b)  to perform experiment(s)/conduct research

- 1) Have you reviewed the Intel ISEF rules relevant to this project?     Yes     No
- 2) How did the student get the idea for her/his project? Was it a subset of your work?  
(e.g. Was the project assigned, picked from a list, an original student idea, etc.)
- 3) Did the student(s) work on the project as a part of a research group?     Yes     No  
If yes, how large was the group and what kind of research group was it (students, group of adult researchers, etc.)
- 4) What specific procedures or equipment did the student(s) actually use for the project?  
Please list and describe. (Do not list procedures student only observed.)
- 5) How independent or creative was the student's/students' work?

*Student research projects dealing with human subjects, vertebrate animals or potentially hazardous biological agents require review and approval by an institutional regulatory board (IRB/IACUC/IBC). Copy of approval(s) must be attached, if applicable.*

_____	_____	_____
Supervising Adult's Printed Name	Signature	Title
_____	_____	_____
Institution	Date Signed (must be after experimentation)	
_____	_____	_____
Address	Email/Phone	

May be required for research involving human subjects, 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 subjects  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) 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: \_\_\_\_\_

4) Describe the safety precautions and training necessary for this project:

**To be completed by the Qualified Scientist:**

I certify that I have reviewed and approved the **Research Plan** 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**. 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** 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.

Must be completed before experimentation.

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

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

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

1. List/identify the hazardous chemicals, activities, devices or microorganisms exempt from pre-approval (see Potentially Hazardous Biological Agent rules) that will be used.
  
  
  
  
  
  
  
  
  
  
2. Identify and assess the risks involved.
  
  
  
  
  
  
  
  
  
  
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** and will provide direct supervision.

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

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Review

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

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

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

required for all research involving human participants not conducted at a Registered Research Inst.  
(IRB approval required before experimentation.)

Student's Name(s) \_\_\_\_\_ Title of Project \_\_\_\_\_

Adult Sponsor \_\_\_\_\_ Contact Phone/Email \_\_\_\_\_

**Must be completed by Student Researcher(s) in collaboration with the Adult Sponsor/Designated Supervisor/Qualified Scientist:**

1.  I have submitted my Research Plan which addresses ALL areas indicated in the Human Participants Section of the Research Plan Instructions.
2.  I have attached any surveys or questionnaires I will be using in my project.  
 Any published instrument(s) used was /were legally obtained.
3.  I have attached an informed consent that I would use if required by the IRB.
4.  Yes  No Are you working with a Qualified Scientist?  
Name: \_\_\_\_\_ Degree: \_\_\_\_\_  
Email Address/Phone Number: \_\_\_\_\_  
Experience/Training as it relates to this project: \_\_\_\_\_

**Must be completed by Institutional Review Board (IRB) after review of the research plan.** The submitted Research Plan must address all areas indicated on the Human Participants section of the Research Plan Instructions. Check one of the following:

- Research project requires revisions and is **NOT approved** at this time. IRB will attach document indicating concerns and/or requested revisions.
- Research project is **Approved** with the following conditions below: (All 5 must be answered)
1. Risk Level (check one):  Minimal Risk  More than Minimal Risk
  2. Qualified Scientist (QS) Required:  Yes  No
  3. Written Minor Assent required for minor participants:  
 Yes  No  Not applicable (No minors in this study)
  4. Written Parental Permission required for minor participants:  
 Yes  No  Not applicable (No minors in this study)
  5. Written Informed Consent required for participants 18 years or older:  
 Yes  No  Not applicable (No participants 18 yrs or older in this study)

**IRB SIGNATURES (All 3 signatures required)** 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 and agree with the above IRB determinations.**

**Medical or Mental Health Professional (a psychologist, psychiatrist, medical doctor, licensed social worker, licensed clinical professional counselor, physician's assistant, or registered nurse)**

Printed Name \_\_\_\_\_ Degree/Professional License \_\_\_\_\_

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

**School Administrator**

Printed Name \_\_\_\_\_ Degree/Professional License \_\_\_\_\_

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

**Educator**

Printed Name \_\_\_\_\_ Degree/Professional License \_\_\_\_\_

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

# 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 box 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:** \_\_\_\_\_ **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:** \_\_\_\_\_

**Printed Name of Research Participant:**

**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.
3. What will happen to the animals after experimentation?
4. Attach a copy of wildlife licenses or approval forms, as applicable.

## To be completed by 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.  
SRC Pre-Approval Signature:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### To be completed by Veterinarian:

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### To be completed by Designated Supervisor or qualified supervisor when applicable:

- I certify that 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 certify that I will directly supervise the experiment.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# 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.)

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. a. Pain designation for the IACUC protocol: \_\_\_\_\_  
b. Pain designation for student's project: \_\_\_\_\_
3. Describe, in detail, the role of the student in this project: animal procedures and related equipment that were involved with, oversight provided and safety precautions employed. (Attach extra pages if necessary.)

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

No

Yes, Be sure to 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.

### Certification or Documentation of Student Researcher Training

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Potentially Hazardous Biological Agents Risk Assessment Form (6A)**  
Required for research involving microorganisms, rDNA, fresh/frozen tissue, blood and body fluids.  
SRC/IACUC/IBC approval required before experimentation.

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

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

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

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 equip., 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.

**To be completed by Qualified Scientist or Designated Supervisor**

1. What training will the student receive for this project?
2. Do you concur with the biosafety information and recommendation provided by the student researcher above?  
 Yes    No   If no, please explain.
3. Experience/training of Designated Supervisor as it relates to the student's area of research (if applicable)

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

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date of Signature

**To be completed by SRC: (Check all that apply.)**

- The SRC has carefully studied this project's Research Plan and the risk level assessment above **prior to experimentation** and approves this study as a BSL-1 study, which must be conducted at a BSL-1 or above laboratory.  
Date of SRC approval (before experimentation) \_\_\_\_\_
- The SRC has carefully studied this project's Research Plan and the risk level assessment above **prior to experimentation** and approves this study as a BSL-2 study, which must be conducted at a BSL-2 or above laboratory.  
Date of SRC approval (before experimentation) \_\_\_\_\_
- This project was conducted at a Research Institution and was reviewed and approved by the appropriate institutional board (e.g. IACUC, IBC) before experimentation at a BSL-1 or BSL-2 laboratory and complies with the Intel ISEF rules. The required institutional forms are attached.  
Date of SRC approval (after experimentation) \_\_\_\_\_
- The Research Institution where this study was conducted does not require approval for this type of study. The student has received proper training and the project complies with Intel ISEF rules. Attached is a letter from an institutional representative certifying the above.  
Date of SRC approval \_\_\_\_\_

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

\_\_\_\_\_  
Signature

## HUMAN AND VERTEBRATE ANIMAL TISSUE Form (6B)

Required for projects using fresh/frozen tissue, primary cell 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 tissue(s), organ(s), or part(s) will be used, or vertebrate animals?

2) Where will the above tissue, organ, or part be obtained (identify each separately):

3) If the tissue is obtained from a source within a research institution, please provide information regarding the vertebrate study from which the tissue was obtained. 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 Signed \_\_\_\_\_  
(Must be prior to experimentation.)

Title \_\_\_\_\_

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

Institution \_\_\_\_\_

## Continuation Projects Form (7)

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

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 be on the form; use an additional form for 2008-2009 and earlier projects.

Components	Current Research Project	Previous Research Project
1. Title		2010-2011  2009-2010
2. Change in goal/purpose/objective		2010-2011  2009-2010
3. Changes in methodology		2010-2011  2009-2010
4. Variables studied		2010-2011  2009-2010
5. Additional changes		2010-2011  2009-2010

Attached are:

2010-2011 Abstract and Research Plan

2009-2010 Abstract and Research Plan

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

RESEARCH PROPOSAL CRITERIA

A. "HYPOTHESIS TO BE TESTED"--Give a statement of your hypothesis or ask it in question form. It must be one of current scientific interest that is experimentally verifiable.

B. "EXPERIMENTAL METHODS"--Outline your test procedure defining how your experimental method can be used to generate data which relate directly to the testing of your hypothesis.

SUBTITLES WITH DISCUSSION:

- 1) What are you going to measure?
- 2) Variable ?
- 3) Control?
- 4) Period of Measurement?
- 5) Length of Experiment?

6) Who is your mentor? What are their qualifications?

C. "ANTICIPATED RESULTS"--What do you expect the trend(s) in your data to signify? Are there any methods that you already anticipate as problem areas? How can the experimental method be improved or your hypothesis altered?

Grading checklist for:

NAME

DATE

PER

title page, abstract, results, conclusion, and appendix sections  
of the technical paper

5 pts. Title page- all elements present

20 pts. Abstract- 5 points for each element

hyp, methods & materials, results, conclusion

40 pts. Results- 10 points- statement of findings

5 points- calculations

10 points- graph 1

10 points- graph 2

5 points- ungraphical findings

30 pts. Conclusion- 10 points- hyp. supported or negated

10 points- link to results

10 points- improvements

5 pts. Appendix- data, etc.

Guidelines  
for  
Introduction, Methods and Materials, and Literature cited Sections  
of the Technical Paper for the Science Project

Developed By  
Chip Burrows  
Kathy Head  
Karen Morrow

*Objective:* The students will successfully complete the Introduction, Methods and Materials, and Literature Cited sections of the technical paper before physical research in testing of the hypothesis begins.

*Purpose:* The student enrolled in an honors science class is provided guidelines to follow while writing these three sections of the technical paper which is in partial fulfillment of the requirements to successfully complete this course. Specifically, the following weighted criteria address the INTRODUCTION, METHODS, and MATERIALS, and LITERATURE CITED sections on the checklist. These three sections must be completed *before* research is begun. Similarly, the RESULTS, CONCLUSIONS, and APPENDIX sections cannot be written until *after* the testing and analysis are completed. When you have completed the INTRODUCTION, METHODS and MATERIALS, and LITERATURE CITED sections, you will be in the position to "hit the ground running" when you have obtained the required equipment.

Each of the sections contain specific instructions and examples. Read these carefully, keeping in mind how you can adapt the material to suit your project's needs. Remember that this is TECHNICAL WRITING. Be concise.

*Introduction:* Introduces the research, issue, or problem

40%

It must include:

1. a statement of your hypothesis in a non question form.
2. the contemporary relevance of your research in this area.
3. a review of the research (historical background) in this area that has preceded yours.