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Acknowledgment

Fair directors, teachers, scientists, parents, and adult volunteers inspire and encourage students to explore and investigate their world through hands-on research. Those of you who work with these young people are rarely recognized and never can be adequately thanked. Without you, precollege science and engineering projects and science and engineering fairs would not be possible. Science Service applauds your commitment and appreciates your hard work. We sincerely hope that our efforts to enhance these Rules will serve you in working with students.

Please address any general questions regarding the Intel ISEF to:

Science Service

Science Education Department
1719 N Street, NW, Washington, DC 20036
office: 202/785-2255, fax: 202/785-1243, sciedu@sciserv.org

For specific rules questions, please email:

SRC@sciserv.org

The ISEF SRC members listed below will be using the above email address to respond to rules inquiries.

Intel ISEF SRC

Dr. Nancy Aiello, Chairperson (EST)

home: 540/554-8748

Dr. James Stevens (MST)

office: 303/315-2680, home: 303/696-1504, cell: 303-921-1076, fax: 303/315-3987

Mr. Henry Disston (EST)

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Mrs. Evelyn Montalvo (EST)

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These Rules apply to

The 2005 Intel International Science and Engineering Fair Phoenix, Arizona, USA, May 8-14, 2005

A Science Service educational program
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Also available on the Web: <http://www.sciserv.org/isef/rules.asp>

❖ Changes & Modifications for 2004-May 2005 ❖

General

- Adherence to the ethics statement was added to the requirements for all projects.
- A clarification of conditions for longitudinal studies was added.
- Membership in team projects cannot be changed during a given research year including converting from an individual project or vice versa, but may be altered in subsequent years.
- Introduction or disposal of non-native species, toxic chemicals or pathogens into the environment is prohibited.
- Eliminated the title of Animal Care Supervisor. Animal care supervision becomes the responsibility of a Designated Supervisor.
- There have been changes in category designations for the Intel ISEF.

Vertebrate Animals

This section has major revisions and reorganization. Please review carefully.

- There are two categories of vertebrate animal studies:
 - A) Observational, behavioral or nutritional studies which can be conducted in a non-regulated site and need prior approval by an SRC
 - B) Studies which must be conducted at a regulated research institution and need prior approval by an Institutional Animal Care and Use Committee
- Each category of vertebrate animal studies requires a different Vertebrate Animal Form (Form 5A or Form 5B)

Human and Vertebrate Animal Tissues

This section was modified. Please review carefully.

- If a tissue is obtained from an animal that was euthanized solely for a student's project, the study must be considered a vertebrate animal project and must adhere to the vertebrate animal rules.
- All other human and vertebrate animal tissue studies do not need prior SRC review and can be supervised by a Designated supervisor
- A tissue form is required for ALL tissue studies regardless of the source including established cell and tissue cultures, meat and meat by-products and hair.
- There have been modifications to the Human and Vertebrate Animal Tissue Form (6)

❖ Rules on the Web ❖

www.sciserv.org/isef/rules.asp

The International Rules and Guidelines for Science Fairs is available on the Science Service website in a number of formats to better aid all of those involved in the process: students, parents, teachers, mentors, fair directors and local, regional and state scientific review committees (SRC) and institutional review boards (IRB).

- [International Rules and Guidelines](#) - The full text of the International Rules and the forms both in html and in a downloadable format.
- The [Intel ISEF Rules Wizard](#) - This "wizard" asks a series of questions about your planned project and will provide a list of forms that you need to complete.
- [Clarification for Forms & Dates](#) - This document lists each form in the International Rules and Guidelines and provides a brief explanation of the form's purpose and when in the science fair project process it should be completed.
- [Common SRC Problems](#) - This list was generated from the SRC reviews leading up to the 2004 Intel ISEF. Read these to get pointers on what NOT to do.

❖ Intel ISEF Category Descriptions ❖

1) Behavioral and Social Sciences

Human and animal behavior, social and community relationships—psychology, sociology, anthropology, archaeology, ethology, ethnology, linguistics, learning, perception, urban problems, reading problems, public opinion surveys, educational testing, etc.

2) Biochemistry

Chemistry of life processes—molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones, etc.

3) Botany

Study of plant life—agriculture, agronomy, horticulture, forestry, plant taxonomy, plant physiology, plant pathology, plant genetics, hydroponics, etc.

4) Chemistry

Study of nature and composition of matter and laws governing it—physical chemistry, organic chemistry (other than biochemistry), inorganic chemistry, materials, plastics, fuels, pesticides, metallurgy, soil chemistry, etc.

5) Computer Science

Study and development of computer hardware, software engineering, internet networking and communications, graphics (including human interface), simulations / virtual reality or computational science (including data structures, encryption, coding and information theory).

6) Earth Science

Geology, mineralogy, physiography, oceanography, meteorology, climatology, speleology, seismology, geography, etc.

7) Engineering

Technology; projects that directly apply scientific principles to manufacturing and practical uses—civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental engineering, etc.

8) Environmental Science

Study of pollution (air, water, and land) sources and their control; ecology.

9) Mathematics

Development of formal logical systems or various numerical and algebraic computations, and the application of these principles—calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability.

10) Medicine and Health

Study of diseases and health of humans and animals—dentistry, pharmacology, pathology, ophthalmology, nutrition, sanitation, dermatology, allergies, speech and hearing, etc.

11) Microbiology

Biology of microorganisms—bacteriology, virology, protozoology, fungi, bacterial genetics, yeast, etc.

12) Physics

Theories, principles, and laws governing energy and the effect of energy on matter—solid state, optics, acoustics, particle, nuclear, atomic, plasma, superconductivity, fluid and gas dynamics, thermodynamics, semiconductors, magnetism, quantum mechanics, biophysics, etc.

13) Space Science

Astronomy, planetary science, etc.

14) Zoology

Study of animals—animal genetics, ornithology, ichthyology, herpetology, entomology, animal ecology, paleontology, cellular physiology, circadian rhythms, animal husbandry, cytology, histology, animal physiology, invertebrate neurophysiology, studies of invertebrates, etc.

❖ Intel ISEF Display and Safety Regulations ❖

Please contact either of the following with any questions regarding the Intel ISEF Display and Safety Regulations:

ISEF D&S Chairperson:

Dayon Taylor
email: dtaylor1@usit.net

Science Service:

William A. Greene
email: bgreene@sciserv.org

Not Allowed at Project or in Booth

1. Living organisms, including plants
2. Taxidermy specimens or parts
3. Preserved vertebrate or invertebrate animals
4. Human or animal food
5. Human/animal parts or body fluids (for example, blood, urine)
6. Plant materials (living, dead, or preserved) which are in their raw, unprocessed, or non-manufactured state (Exception: manufactured construction materials used in building the project or display)
7. Laboratory/household chemicals including water (Exceptions: water integral to an enclosed apparatus or water supplied by the Display and Safety Committee)
8. Poisons, drugs, controlled substances, hazardous substances or devices (for example, firearms, weapons, ammunition, reloading devices)
9. Dry ice or other sublimating solids
10. Sharp items (for example, syringes, needles, pipettes, knives)
11. Flames or highly flammable materials
12. Batteries with open-top cells
13. Awards, medals, business cards, flags, endorsements and/or acknowledgments (graphic or written) (Exception: Intel ISEF medal(s) may be worn at all times.)
14. Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissections, necropsies, or other lab procedures
15. Active Internet or e-mail connections as part of displaying or operating the project at the Intel ISEF
16. Glass or glass objects unless deemed by the Display and Safety Committee to be an integral and necessary part of the project (Exception: 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 Science Service (for example, large vacuum tubes or dangerous ray-generating devices, empty tanks that previously contained combustible liquids or gases, pressurized tanks, etc.)

Allowed at Project or in Booth BUT with the Restrictions Indicated

1. Soil or waste samples **if permanently encased in a slab of acrylic**
2. Postal addresses, World Wide Web and e-mail addresses, telephone numbers, and fax numbers **of Finalist only**
3. Photographs and/or visual depictions **if:**
 - a. They are not deemed offensive or inappropriate by the Scientific Review Committee, the Display and Safety Committee, or Science Service.
 - b. Credit lines of their origins (“Photograph taken by...” or “Image taken from...”) are attached. (If all photographs being displayed were taken by the Finalist or are from the same source, one credit line prominently displayed is sufficient.)
 - c. They are from the Internet, magazines, newspapers, journals, etc., and credit lines are attached. (If all photographs/images are from the same source, one credit prominently displayed is sufficient.)
 - d. They are photographs or visual depictions of the Finalist.
 - e. They are photographs of human subjects for which signed consent forms are at the project or in the booth. (Human Subjects Form 4 or equivalent photo release signed by the human subject must be included in paperwork and properly checked on the Official Abstract and Certification.)
4. Any apparatus with unshielded belts, pulleys, chains, or moving parts with tension or pinch points **if for display only and not operated**
5. Class II lasers **if:**
 - a. Operated only by the Finalist
 - b. Operated only during Display and Safety inspection and during judging
 - c. Labeled with a sign reading “Laser Radiation: Do Not Stare into Beam”
 - d. Enclosed in protective housing that prevents physical and visual access to beam
 - e. Disconnected when not operating
6. Class III and IV lasers **if for display only and not operated**
7. Any apparatus producing temperatures that will cause physical burns **if adequately insulated.**

(Display and Safety Regulations Continued)

Electrical Regulations at the Intel ISEF

1. Finalists requiring 120 or 220 Volt A.C. electrical circuits must provide a UL-listed 3-wire extension cord which is appropriate for the load and equipment.
2. Electrical power supplied to projects and, therefore, the maximums allowed for projects is 120 or 220 Volt, A.C., single phase, 60 cycle. 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 A.C.” or “220 Volt A.C.” is intended to encompass the corresponding range of voltage as supplied by the facility in which the Intel ISEF is being held.
3. All electrical work must conform to the *National Electrical Code* or exhibit hall regulations. The guidelines presented here are general ones, and other rules may apply to specific configurations. The on-site electrician may be requested to review any electrical work on any project.
4. All electrical connectors, wiring, switches, extension cords, fuses, etc. must be UL-listed and must be appropriate for the load and equipment. Connections must be soldered or made with UL-listed connectors. 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.
5. Wiring which is not part of a commercially available UL-listed appliance or piece of equipment must have a clearly visible fuse or circuit breaker on the supply side of the power source and prior to any project equipment.
6. There must be an accessible, clearly visible on/off switch or other means of disconnect from the 120 or 220 Volt power source.

Maximum Size of Project at the Intel ISEF

30 inches (76 centimeters) deep
48 inches (122 centimeters) wide
108 inches (274 centimeters) high (from floor to top of project)

At the Intel ISEF, fair-provided tables will not exceed a height of 36 inches (91 centimeters).

Project must be positioned at the back of the booth and parallel to the rear of the booth.

Maximum project sizes include all project materials and supports. If a table is used, it becomes part of the project and must not itself exceed the allowed dimensions nor may the table plus any part of the project exceed the allowed dimensions.

At the Intel ISEF, any project with a component that will be demonstrated by the Finalist must be demonstrated only within the confines of the Finalist’s booth. When not being demonstrated, the component plus the project must not exceed allowed dimensions.

Handouts/Official Abstract and Certification at the Intel ISEF

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.

The only abstract allowed anywhere at a project is the official abstract. The term “abstract” may not be used as a title or reference for any information on a Finalist’s display or in a Finalist’s materials at the project except as part of displaying the official abstract.

An original stamped/embossed official abstract and certification must appear on the display board or in a vertical position at the project.

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

Items Required to be Visible at the Project at the Intel ISEF

Note: All forms required to be visible must be vertically displayed.

- Original of official Abstract and Certification as approved and stamped/embossed by the Intel ISEF Scientific Review Committee
- Completed Intel ISEF Project Set-up Approval Form SRC/DS2 (Received on-site at the Fair)
- Registered Research Institutional/Industrial Setting Form (1C) — if applicable
- Continuation Projects Form (7) — if applicable

Additional Items Required to be at the Project But Not Displayed at the Intel ISEF

- Human Subjects Form (4) (or equivalent form provided by a registered research institution) for human subjects of the research, surveys, photographs, etc. (if applicable) are confidential information, must **not** be displayed, but **must be available in the booth** in case asked for by a judge or other Intel ISEF official. Human Subjects Form (4) or an equivalent photograph release signed by the human subject is required for visual images of humans (other than the Finalist) displayed as part of the project.
- Other forms [including, but not limited to, Checklist for Adult Sponsor/Safety Assessment Form (1), Research Plan (1A), 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.

General Intel ISEF Information and Requirements

1. No changes, modifications, or additions to projects may be made after approval by the Display and Safety Committee and the Scientific Review Committee.
2. A project data book and research paper are not required but are recommended.
3. The only acceptable informed consent form for use at the Intel ISEF is the official Human Subjects Form (4) in the International Rules for Pre-College Science Research or an equivalent form provided by a registered research institution (see Form 1C) or, in the case of display of photographs only, an equivalent photograph release signed by the human subject.
4. Prior years' written material or visual depictions may not be displayed on the vertical display board, except that the project **title** displayed in the Finalist's booth may mention years or which year the project is (for example, "Year Two of an Ongoing Study"). Continuation projects must have the Continuation Project Form (7) displayed.
5. 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.
6. No photographs or any other visual depictions may be included in any manner at a project or in the booth if they are deemed visually offensive or inappropriate by the Scientific Review Committee, the Display and Safety Committee, or Science Service. This includes, but is not limited to, visually offensive photographs or visual depictions of invertebrate or vertebrate animals, including humans. The decision by any one of the groups mentioned above is final.
7. If a project fails to qualify and is not removed by the Finalist, Science Service will remove the project in the safest manner possible but is not responsible for damage to the project.
8. Any copies of disks, CDs, printed materials, etc. (including unofficial abstracts) designed to be distributed to judges or members of the public which are confiscated by the Display and Safety Committee will be discarded and will not be returned to the Finalist.
9. Project sounds, lights, odors, or any other display items must not be distracting.
10. Project must be positioned at the back of the booth and parallel to the rear of the booth.
11. Finalists must be present at their projects for the Display and Safety inspection. The inspection is a process that takes place between the Finalist and inspector; therefore, no other persons should be present representing the Finalist beyond an interpreter if necessary.
12. Any project with a component that will be demonstrated by the Finalist must be demonstrated only within the confines of the Finalist's booth. When not being demonstrated, the component plus the project must not exceed allowed dimensions
13. No food or drinks, except small containers of bottled water for personal consumption, are allowed in the Exhibit hall.

❖ ALL PROJECTS ❖

❖ Ethics Statement

Scientific fraud and misconduct are not condoned at any level of research or competition. Plagiarism, use or presentation of other researcher's work as one's own, forgery of approval signatures and fabrication or falsification of data or approval dates will not be tolerated. Fraudulent projects will fail to qualify for competition in affiliated fairs or the ISEF.

❖ Eligibility/Limitations

- 1) Any student in grades 9-12 or equivalent is eligible, none of whom has reached age 21 on or before May 1 preceding the Intel ISEF.
- 2) Each student may enter only **one** project which covers research done over a maximum of 12 continuous months between January 2004 and May 2005.
- 3) 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.
- 4) Team projects may have a maximum of three members.
- 5) Each ISEF-affiliated fair may send up to two Individual Project Finalists and one Team Project of two or three Finalists to the Intel ISEF.

❖ Requirements

- 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) Before experimentation begins, an Institutional Review Board (IRB) or Scientific Review Committee (SRC) must review and approve all projects involving: human subjects, vertebrate animals, pathogenic agents, controlled substances or recombinant DNA.
- 3) Every student must complete **Research Plan (1A)**, **Research Plan Attachment** and **Approval Form (1B)** and review the project with the Adult Sponsor as the **Checklist for Adult Sponsor (1)** is completed.
- 4) A Qualified Scientist is required for all studies involving pathogenic or potentially-pathogenic agents, nonexempt recombinant DNA, federally-controlled medications, more than minimal risk in human subjects and for most vertebrate animal studies.
- 5) 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 (see *Student Handbook*).
- 6) Each student should display a project data book and research paper (see *Student Handbook*).
- 7) All signed forms, certifications, and permits must be available for review by an SRC just before each fair a student enters.
- 8) After initial IRB/SRC approval (if required), any proposed changes in the **Research Plan (1A)** and **Research Plan Attachment** of the project must repeat the approval process before laboratory experimentation/data collection resumes.
- 9) 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.
- 10) Any continuing project must document that the additional research is new and different. (See **Continuation Projects Form (7)**)
- 11) If work was conducted in an institutional or industrial setting any time during the current ISEF project year, **Regulated Research Institutional/Industrial Setting Form (1C)** must be completed.
- 12) Projects must adhere to local, state, country and U.S. Federal laws and regulations.
- 13) All projects must adhere to the Ethics Statement above.
- 14) Intel ISEF exhibits must adhere to Intel ISEF safety and size requirements.
- 15) Introduction or disposal of foreign or non-native substances or species, toxic chemicals or pathogenic substances into the environment is prohibited.
- 16) It is the student's responsibility to check with their affiliated fair for any additional restrictions or requirements.

❖ Continuation of Projects

- 1) Students will be judged only on the most recent year's research. This project year includes research conducted over a maximum of 12 continuous months from January 2004 to May 2005.
- 2) Display boards 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.
- 3) Any project in the same field of study from a previous year's project is considered a continuation. These projects must document that the additional research is new and different from prior work (e.g. testing a new variable or new line of investigation, etc.) Repetition of previous experimentation or increasing sample size are examples of unacceptable continuations.
- 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 the critical variable. (Examples: Effect of high rain or drought on soil in a given basin, return of flora and fauna in a burned period 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.

NOTE: For competition in the Intel ISEF, documentation must include the **Continuation Project Form (7)**, the prior year's abstract and **Research Plan (1A)** including an attached research plan or equivalent documentation. Copies must be attached behind the current year's **Research Plan (1A)**, **Research Plan Attachment** and forms. Each page of the previous year's forms must be clearly labeled in the upper right hand corner with the year (ex: 2003-2004). Retain all previous years' paperwork in case an SRC requests documentation of experimentation conducted in other prior years.

❖ Team Projects

- 1) Team Projects compete in a separate "team" category against all other Team Projects. An ISEF Affiliated Fair has the option of sending a team project, in addition to two individual projects, to the Intel ISEF. ISEF-Affiliated Fairs are not required to have Team Projects, but are encouraged to do so.
- 2) Teams may have up to three members. NOTE: 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, but may be altered in subsequent years.
- 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 **Team Research Plan (1A)** and other required forms.
- 6) Full names of all team members must appear on the abstract and forms.

1) The Student Researcher(s)

The student researcher is responsible for all aspects of the research project including enlisting 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.

The student must be in grades 9-12 or equivalent and must not have reached age 21 on or before May 1 preceding the Intel ISEF. Students may compete as a team of up to 3 members.

Scientific fraud and misconduct are not condoned at any level of research or competition. Plagiarism, use or presentation of other researcher's work as one's own, forgery of approval signatures, and fabrication or falsification of data or approval dates will not be tolerated. Fraudulent projects will fail to qualify for competition in affiliated fairs or the 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 ultimately responsible not only for the health and safety of the student conducting the research, but also for the humans or animals used as subjects. The Adult Sponsor must review the student's **Research Plan (1A)** 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 Adult 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 (1A)**. 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 human subjects. All proposed human research must be reviewed and approved by an IRB before experimentation begins. This includes 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.

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. This IRB must include:

- a) a science teacher
- 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, licensed psychologist, or licensed social worker.

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.

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 an 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 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 ISEF Affiliated Fair SRC in reviewing and approving projects. The operation and composition of the local and ISEF-Affiliated Fair SRCs must fully comply with the International Rules.

Any proposed research in the following areas must be reviewed and approved BEFORE experimentation: projects involving vertebrates, pathogenic and potentially pathogenic agents, controlled substances and recombinant DNA (rDNA). (Human studies reviewed and approved by a properly constituted IRB do not have to be reviewed by the SRC until the Fair competition.)

ALL projects must be reviewed and approved by the SRC after experimentation and shortly before competition in an ISEF-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.)

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

- a) a biomedical scientist (Ph.D., M.D., D.V.M., D.D.S., or D.O.)
- b) a science teacher
- c) at least one other member

Note: If animal research is involved, at least one member must be familiar with proper animal care procedures.

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. 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.

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 and animal research
- h) compliance with rules regarding recombinant DNA, pathogenic agents, controlled substances and hazardous substances and devices
- i) documentation of substantial expansion for continuation projects
- j) compliance with the ISEF ethics statement

7) The ISEF Scientific Review Committee (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 to ensure that students have followed all applicable Rules.

The ISEF SRC, like an ISEF Affiliated Fair SRC, is made up of a group of adults knowledgeable about regulations concerning experimentation in restricted areas. The ISEF SRC reviews the **Checklist for Adult Sponsor, Abstract, Research Plan (1A),** including the **Research Plan Attachment,** 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.

If a fair director or ISEF Affiliated Fair SRC member has any questions concerning the process, feel free to contact Science Service or a member of the ISEF SRC. (see page 2)

The ISEF SRC is the final authority on projects that are eligible to compete in the Intel ISEF. In some cases, the ISEF SRC may have questions about particular projects. Usually, after students explain their procedures and research to the 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).

It is important that students retain all original signed forms. Even though copies may have been sent with registration papers, students must bring original signed forms to the Intel ISEF in case an SRC interview is necessary. **Do not send original forms to Science Service.**

❖ Human Subjects ❖

When students conduct research with human subjects, the rights and welfare of those participating in the study must be protected. There are federal regulations protecting human subjects that require the prior review of human subjects research by an Institutional Review Board and, in most cases, the informed consent of research subjects. The following rules were developed to help student researchers adhere to the Federal regulations and to, therefore, protect the rights and welfare of both the research subjects and the student researcher.

Rules

- 1) All research projects involving human subjects, including any revisions, must be reviewed and approved by an **Institutional Review Board (IRB)** before the research begins.
- 2) Human subjects research includes projects involving:
 - Subjects participating in physical activities (e.g., physical exertion, ingestion of any substance, any medical procedure),
 - Psychological and opinion studies (e.g., survey, questionnaire, test of any kind),
 - Behavioral observations,
 - Studies in which the researcher is the subject of the research.
- 3) When developing the Research Plan, student researchers must evaluate and minimize the physical and/or psychological risks to their human subjects.
- 4) The documentation of written **Informed Consent** is required for most projects. **Children/Minors participating in most research will require special consent procedures including assent of the child/minor and consent of the parent/guardian.** Children/Minors are persons who have not attained the legal age for consent; in most jurisdictions the legal age is 18 and in some jurisdictions this may include all students still in secondary school.
- 5) Research conducted by a pre-college student at federally regulated research institutions (e.g., universities, medical centers, NIH, correctional institutions, etc.) must be reviewed and approved by that institution's IRB. A copy of the IRB approval for the entire project (which must include the research procedures/measures the student is using) or an official letter from the IRB attesting to this approval is required. A letter from the mentor is not sufficient documentation of IRB review and approval.
- 6) A student may observe and collect data for analysis of medical procedures and medication administration only under the direct supervision of a qualified professional. The qualified professional must be named in the research protocol to be specifically approved by the IRB. Students are prohibited from administering medications and performing medical procedures on human subjects. The IRB must confirm that the student is not violating the medical practice act of the particular state or nation in which he/she is conducting the research.

- 7) Student researchers may NOT publish or display information in a report that identifies the human subjects directly or through identifiers linked to the subjects, (including photographs), without written consent. (Public Health Service Act, 42, USC 241 (d)).
- 8) All standardized tests that are not in the public domain must be administered, scored and interpreted by a qualified scientist as required by the instrument publisher. Any and all use and distribution of the test must be in accordance with the publisher's requirements including procurement of legal copies of the instrument.
- 9) The use of the internet to obtain data for human subjects research is permissible. The Student Researcher, Adult Sponsor and IRB must take additional care to ensure that survey responses remain confidential and that, when required, informed consent is documented.
- 10) Any proposed changes in the Research Plan (1A) and Attachment by the student after initial IRB approval must have subsequent IRB approval before such changes are made and before experimentation resumes.

Risk Evaluation

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

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

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

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

1) Physical

- a. **Exercise** other than ordinarily encountered in DAILY LIFE by that subject.
- b. **Ingestion of any substance** or exposure to any potentially hazardous materials.

2) Psychological

- a. Any activity (e.g. survey, questionnaire, viewing of stimuli) or experimental condition that could potentially result in **emotional stress**. For example, answering questions related

to personal experiences such as sexual, physical or child abuse and divorce and/or psychological well-being (e.g. depression, anxiety, suicide) must be considered more than minimal risk. Additionally, research activities that involve exposing subjects to stimuli or experimental conditions that could potentially result in emotional stress must also be considered more than minimal risk. Examples include violent or distressing video images, distressing written materials or activities that could potentially result in feelings of depression, anxiety, or low self-esteem in subjects.

- b. Any activity that could potentially result in negative consequences for the subject due to **invasion of privacy or breach of confidentiality**. Confidentiality involves taking careful measures to ensure that the research data and/or responses are not disclosed to the public or unauthorized individuals with identifiable information. When research activities involve collection of personal information (e.g. history of abuse, drug use, opinions, fingerprints) or health-related data (genetic material, blood, tissue) the researcher must consider risks related to invasion of privacy and possible breach of confidentiality. Ways to reduce these risks include collecting data anonymously or developing data collection procedures that make it impossible to link any identifying information (e.g. subject's name) with his/her responses or data. Anonymity involves collecting research data in such a way that it is impossible to connect research data (e.g. responses, questionnaires) with the individual who provided the data. That is, personal identifiers (e.g. names, birthdates, social security numbers) are not collected or linked with the data.

Informed Consent

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

Section A. Informed Consent Required

Documentation of informed consent is required for the following as long as the study does not meet any of the criteria for a waiver as described in Section B.:

- 1) When the IRB determines that a research study involves physical or psychological activities with more than minimal risk.
- 2) When the IRB determines that the project could *potentially* result in emotional stress to a research subject.
- 3) When the IRB determines that the research subjects belong to a risk group and the study does not meet any of the criteria below for a waiver.

Section B. Informed Consent May Be Waived

The IRB may waive the requirement for documentation of written informed consent if the research involves **only minimal risk and anonymous data collection and if it is one of the following**:

- a) Research involving the observation of legal public behavior
- b) Research involving collection or study of existing publicly available data or records
- c) Research involving normal educational practices
- d) Research on individual or group behavior or characteristics of individuals where the researcher does not manipulate the subjects' behavior and the study does not involve more than minimal risk.
- e) Surveys and questionnaires that are determined by the IRB to involve perception, cognition, or game theory and do NOT involve gathering personal information, invasion of privacy or potential for emotional distress. If there is any uncertainty regarding the appropriateness of waiving informed consent, it is strongly recommended that informed consent be obtained.
- f) Studies involving physical activity where the IRB determines that no more than minimal risk exists and where the probability and magnitude of harm or discomfort anticipated in the research are not greater (in and of themselves) than those ordinarily encountered in DAILY LIFE or during performance of routine physical activities.

If a research subject is under 18 years of age, it is recommended that, in all cases, informed consent be obtained. Both the parent/legal guardian and the school age research subject must sign **Human Subjects Form (4)**. However, an IRB may decide that informed consent is not required because of the allowable exceptions listed above. **When the IRB waives informed consent of research subjects under the age of 18 for studies involving surveys or questionnaires, justification of this waiver must be stated on Human Subjects Form (4).**

Review Process

- 1) A student interested in doing a human subjects research project must first **review the rules**, choose a study group and consider the risks of their proposed research. The student must work with their Adult Sponsor who can guide them to a Qualified Scientist, if necessary, to help in the development of their research plan.
- 2) The student must complete the **Research Plan (1A)** and **Attachment, Human Subjects Form (4)** and submit this information along with a copy of any questionnaire, survey or instrument used to collect human data to the Institutional Review Board (IRB). Submission of the appropriate forms does not give the student permission to begin the research.

The IRB must **sign the Approval Form (1B) and Human Subjects and Informed Consent Form (4)**, approving the project, before the research can begin.

- 3) To complete the IRB review process, the IRB must designate the risk-status of the project and other requirements by checking the appropriate box(es) on **Human Subjects Form (4)**. The IRB may require one or more of the following:
 - a. Documentation of written Informed Consent on the **Human Subjects Form (4)**. When the IRB waives informed consent of research subjects under the age of 18 for studies involving surveys or questionnaires, justification of this waiver must be stated on Form 4.
 - b. **Qualified Scientist Form (2)** – The IRB will require the project to be overseen by a Qualified Scientist when there is more than minimal risk involved. If the Qualified Scientist is unable to directly supervise the project, a trained **Designated Supervisor** (and the **Designated Supervisor Form (3)**) will also be required.
 - c. Changes to the **Research Plan** – If the IRB requires changes or modifications of the Research Plan, the student must incorporate those changes into the written **Research Plan** before the IRB signs designating approval.
- 4) After the IRB has approved the project and **all committee members have signed the Human Subjects Form (4)**, the student may begin recruiting and/or interacting with human subjects.
- 5) After experimentation and shortly before fair competition, the SRC reviews and approves previously approved projects to make sure that students followed the approved **Research Plan (1A)** and the rules.
- 6) The following forms are required:
 - a. **Research Plan (1A)**
 - b. **Research Plan Attachment**
 - c. **Approval Form (1B)**
 - d. **Human Subjects Form (4)**
 - e. **Regulated Research Institution Form (1C)** - if applicable
 - f. **Qualified Scientist Form (2)** - if applicable
 - g. **Designated Supervisor Form (3)** - if applicable

Sources of Information

- 1) *Code of Federal Regulation (CFR), Title 45 (Public Welfare), Part 46-Protection of Human Subjects (45CFR46)*
<http://ohrp.osophs.dhhs.gov/humansubjects/guidance/45cfr46.htm>
- 2) Dunn, C. M. and Chadwick, G. L., *Protecting Study Volunteers in Research: A Manual for Investigative Sites* (2002). Boston, MA: Thomson Centerwatch. ISBN 1-930624-36-0.

Can be purchased from:
http://www.ahcpub.com/ahc_root_html/products/sourcebooks/s02603.html

NIH tutorial also provides similar information:
<http://cme.cancer.gov/c01/>
- 3) Penslar, R. L., *Institutional Review Board (IRB) Guidebook*, (1993). Washington, DC: ORRP-NIH
http://ohrp.osophs.dhhs.gov/irb/irb_guidebook.htm
- 4) *Belmont Report*, April 18, 1979
<http://ohsr.od.nih.gov/mpa/belmont.php3>
- 5) *Standards for Educational and Psychological Testing*. (1999). Washington, DC: AERA, APA, NCME.
To order call: (800) 628-4094. If outside US, call (717) 632-3535, Ext. 8087
<http://www.apa.org/science/standards.html>
6. American Psychological Association
750 First Street, NE
Washington, DC 20002-4242
phone: 202-336-5510; 1-800-374-2721
<http://www.apa.org>

Information for students:
<http://www.apa.org/students/>

Information regarding publications:
<http://www.apa.org/publications/>
7. Educational and Psychological Testing
Testing Office for the APA Science Directorate
phone: 202-336-5500
<http://www.apa.org/science/testing.html>

Many of the documents above are also available by contacting:
Office for Human Research Protections
Department of Health and Human Services
The Tower Building
1101 Wootton Parkway, Suite 200
Rockville, MD 20852
phone: 301-496-7005
email: ohrp@osophs.dhhs.gov

❖ Vertebrate Animals ❖

The following rules were developed to help pre-college student researchers adhere to the federal regulations governing professional scientists and to, therefore, protect the welfare of both animal subjects and the student researcher. When students conduct research with animal subjects, the health and well-being of the animal subjects must be protected.

All projects involving vertebrate animals must adhere to the rules below AND to either Section A or Section B rules depending on the nature of the study and the research site.

Rules for ALL Studies Involving Vertebrate Animals

- 1) The use of vertebrate animals in science projects is allowable under the conditions and rules in the following sections. Vertebrate animals, as covered by these rules, are defined as live, nonhuman vertebrate mammalian embryos or fetuses, bird and reptile eggs within three days (72 hours) of hatching, and all other nonhuman vertebrates at hatching or birth.
- 2) Alternatives to the use of vertebrate animals for research must be explored and discussed in the research plan. Alternatives include the following “3 R’s”:
 - Replace vertebrate animals with invertebrates, lower life forms, tissue/cell cultures or computer simulations
 - Reduce the number of animals without compromising statistical validity
 - Refine the experimental protocol to lessen pain or distress to the animals.
- 3) **Research projects which cause more than momentary pain or suffering to vertebrate animals or which are designed to kill vertebrate animals are prohibited.** (Note: Humane euthanasia is permitted under certain conditions when the research is conducted at a regulated research institution. See Section B.)
- 4) The following types of studies on vertebrate animals are **prohibited**:
 - a. All induced toxicity studies such as those using alcohol, acid rain, insecticide, herbicide, heavy metals, etc.
 - b. Behavioral experiments involving operant conditioning with aversive stimuli, mother/infant separation or induced helplessness.
 - c. Studies of pain
 - d. Predator/prey experiments
- 5) Because weight loss is one significant sign of stress, the maximum permissible weight loss or growth retardation (compared to controls) of any experimental or control animal is 15%.
- 6) If an experimental design requires food or water restriction, it must be appropriate to the species, but may not exceed 18 hours.
- 7) If there are unexpected deaths in either the experimental or control groups, the cause of the death must be investigated. If the experimental procedure is responsible for the deaths, the experiment must be immediately terminated. A death rate of 30% or greater in any group or subgroup is not permitted and the project will fail to qualify for competition.
- 8) Students performing vertebrate animal research must follow local, state, country and U.S. federal regulations.
- 9) Except for observational studies, a Qualified Scientist or Designated Supervisor must directly supervise all research involving vertebrate animals.
- 10) A Scientific Review Committee (SRC) and/or an Institutional Animal Care and Use Committee (IACUC) must approve all research before experimentation begins. The research plan for vertebrate animal studies must include the following:
 - a. Justify why animals must be used, including the reasons for the choice of species and the number of animals to be used. Describe any alternatives to animal use that were considered, and the reasons these alternatives were unacceptable. Explain the potential impact or contribution this research may have on the broad fields of biology or medicine.
 - b. Describe in detail, how the animals will be used. Include methods and procedures, such as experimental design and data analysis. Describe the procedures that will minimize the potential for discomfort, distress, pain and injury to the animals during the course of experimentation. Identify the species, strain, sex, age, weight, source and number of animals proposed for use.

Research Sites

Certain types of vertebrate animal studies may be conducted at home, school or other non-regulated research sites, whereas other studies must be conducted at a regulated research institution. A regulated research institution is defined as a professional research/teaching institution that is regularly inspected by the USDA and is licensed to use animals covered by the Animal Welfare Act. Also included are all federal laboratories such as National Institutes of Health, Veteran’s Affairs Medical Centers and the Centers For Disease Control. In addition, pharmaceutical and biotechnology companies that utilize research animals that are not covered by the Animal Welfare Act but have an operational Institutional Animal Care and Use Committee and program structured in compliance with U.S. federal laws are included in this definition.

A. Non-regulated site

Vertebrate animal studies may be conducted at a **non-regulated** research site (home, school, farm, ranch, in the field, etc.), **ONLY** if each of the following applies:

- The research involves behavioral, observational or supplemental nutritional studies on animals.
- AND
- The research involves only non-invasive and non-intrusive methods that do not negatively affect an animal's health or well-being.

All such studies must adhere to the additional rules listed in Section A to ensure the proper care and treatment of the animals in the study.

B. Regulated Research Institutions

All other studies using vertebrate animals must be conducted in a **regulated research institution** and must follow the additional rules in Section B.

A. Additional Rules for Projects Conducted in a Non-regulated Site

1. Animals must be treated kindly and cared for properly. Animals must be housed in a clean, ventilated, comfortable environment compatible with the standards and requirements appropriate for the species used. They must be given a continuous, clean (uncontaminated) water and food supply. Cages, pens and fish tanks must be cleaned frequently. Proper care must be provided at all times including weekends, holidays, and vacation periods. Animals must be observed daily to assess their health and well-being. A Designated Supervisor is required to oversee the daily husbandry of the animals. The following documents offer space requirements and additional husbandry information:
 - *Federal Animal Welfare Regulation*
 - *Guide for the Care and Use of Laboratory Animals*
 - *Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (Ag-Guide)*
2. The Scientific Review Committee must determine when a veterinarian is required to certify that the research plan and animal husbandry are appropriate. This certification is required before experimentation and the prior SRC approval. It is highly recommended that a veterinarian be consulted in experiments that involve supplemental nutrition and/or activities that would not be ordinarily encountered in the animal's daily life.
3. If an unexpected illness or emergency occurs, the affected animals must have proper medical and nursing care that is directed by a veterinarian. A student researcher is expected to stop experimentation if there is significant weight loss or death in the experimental subjects. The experiment can only be resumed if the cause of illness or death is not related to the experimental procedures and if appropriate steps are taken to eliminate the causal factors.

4. Animals may not be captured from or released into the wild without approval of authorized wildlife or other regulatory officials. Fish may be obtained from the wild only if the researcher releases the fish unharmed, has the proper license, and adheres to state and local fishing laws and regulations.
5. Studies involving animals in their natural environment, as well as animals in zoological parks, where there is no interaction between the experimenter and the subject animals, must have SRC pre-approval but do not require a **Qualified Scientist Form (2)** or a **Designated Supervisor Form (3)**.
6. The final disposition of the animals must be considered and explained on **Vertebrate Animal Form (5A)**. Euthanasia for tissue removal and/or pathological analysis is not permitted for a project conducted in a non-regulated site.
- 7) Any proposed changes in the Research Plan (1A) and Attachment by the student after initial SRC approval must have subsequent SRC approval before such changes are made and before experimentation resumes.
- 8) **The following forms are required:**
 - a. **Research Plan (1A)**
 - b. **Research Plan Attachment**
 - c. **Approval Form (1B)**
 - d. **Vertebrate Animal Form (5A)**
 - e. **Designated Supervisor Form (3) and/or Qualified Scientist Form (2)**

B. Additional Rules for Projects Conducted in a Regulated Research Institution

Some research that is permissible for professionals in research institutions is not appropriate for pre-college students. The following are additional rules for projects conducted in a regulated research institution:

1. The Institutional Animal Care and Use Committee (IACUC) must approve all student research projects before experimentation begins. Such research projects must be conducted under the responsibility of a principal investigator. The local SRC must also review the project to certify that the research project complies with ISEF Rules. This SRC review should occur before experimentation begins.
2. Proper euthanasia at the end of experimentation for tissue removal and/or pathological analysis is permitted. Only the Qualified Scientist or an institutional representative may perform the euthanasia. All methods of euthanasia must adhere to current AVMA Guidelines.

Sources of Information for Animal Care and Use

3. Research projects that cause more than momentary pain or suffering to vertebrate animals are prohibited. The following table relates the USDA Pain Categories and the permissibility of studies for science fair projects.

USDA Pain Categories	Definition	ISEF Guidelines
Category A	<i>Live animals will receive non-painful manipulation. Animals may be euthanized to obtain tissues, cells, etc.</i>	Permitted
Category B	<i>Live animals will receive momentary pain or stressful stimulus without anesthesia, which results in a short-term response. Examples include but are not limited to: injections, field trapping/tagging, blood sampling and standard agricultural husbandry practices.</i>	Permitted
Category C	<i>Live animals will have significant manipulations, surgery, etc., performed while anesthetized. The animals will be euthanized at the termination of the procedure without regaining consciousness.</i>	Permitted only with proper training and certification
Category D	<i>Live animals will have manipulations performed while anesthetized and are allowed to recover and/or animals will develop discernable clinical signs indicating pain, distress, or significant physiological changes spontaneously or as a result of specific experimental procedures. Examples include, but are not limited to: Survival surgical procedures of any type and some studies which would include tumor development. ALL SUCH STUDIES MUST INCLUDE TREATMENT TO ALLEVIATE PAIN OR DISTRESS.</i>	Limited Category D procedures are permitted with proper training and certification. The project must adhere to all ISEF rules. Most Category D projects would be deemed inappropriate for high school students.
Category E	<i>Live animals will experience significant/severe pain or distress, without benefit of anesthetics, tranquilizers or analgesics.</i>	PROHIBITED

4. The following forms are required:
- Research Plan (1A)**
 - Research Plan Attachment**
 - Approval Form (1B)**
 - Regulated Research Institution Form (1C)**
 - Vertebrate Animal Form (5B)**
 - Qualified Scientist Form (2)**
 - Designated Supervisor Form (3) - if applicable**

1) *Guide for the Care and Use of Laboratory Animals*,
Institute of Laboratory Animal Research (ILAR),
Commission on Life Sciences, National Research
<http://dels.nas.edu/ilar/careanduse.asp>

2) *Principles and Guidelines for the Use of Animals in Precollege Education* (a free pamphlet from ILAR)

Can be found online:

http://dels.nas.edu/ilar/prin_guide.asp

To order contact:

National Academies Press
500 Fifth Street, NW
Lockbox 285
Washington, DC 20055
phone: 888-624-8373 or 202-334-3313
fax: 202-334-2451; <http://www.nap.edu>

3) Federal Animal Welfare Act (AWA)
7 U.S.C. 2131-2157
Subchapter A - Animal Welfare (Parts I, II, III)
<http://www.nal.usda.gov/awic/legislat/awicregs.htm>

Above document is available from:

USDA/APHIS/AC
4700 River Road
Riverdale, MD 20737-1234
email: ace@aphis.usda.gov
Tel: (301) 734-7833
Fax: (301) 734-4978

<http://www.aphis.usda.gov/ac/info.html>

4) *Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (Agri-Guide)*
Federation of Animal Science Societies (FASS)
1111 N. Dunlap Avenue
Savoy, IL 61874
(217) 356-3182
<http://www.fass.org/publications.asp>

Sources of Information for Alternative Research and Animal Welfare

1) The National Library of Medicine provides computer searches through MEDLINE:
Reference Librarian
National Library of Medicine
8600 Rockville Pike
Bethesda, MD 20894
1-888-FIND-NLM or 1-888-346-3656
(301) 594-5983; email: custserv@nlm.nih.gov
<http://www.nlm.nih.gov>
<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>

- 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, 4th Floor
Beltsville, MD 20705-2351
phone: (301) 504-6212, fax: (301) 504-7125
<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
Washington, DC 20001
phone: (202) 334-2590, fax: 202-334-1687
email: ILAR@nas.edu
<http://dels.nas.edu/ilar/>

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
Ph: 301-496-1131; Fax: 301-480-3537
Toll Free: 1-888-FIND-NLM or 1-888-346-3656
Email: tehip@tehl.nlm.nih.gov
<http://www.sis.nlm.nih.gov>;
<http://toxnet.nlm.nih.gov/altbib.html>

- 4) Euthanasia Guidelines

2000 Report of the AVMA Panel on Euthanasia.
Journal of the American Veterinary Medical Association
(JAVMA), Vol. 218, No.52: 669-696, March 2001.
<http://www.avma.org/resources/default.asp>

- 5) John's 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.
<http://caat.jhsph.edu/>

❖ Human and Vertebrate Animal Tissue ❖

(For the purpose of student research, all body fluids, including saliva and urine, are to be considered tissue.)

Rules

- 1) Students may do research on tissue that includes, but is not limited to fresh tissue, organs, primary cell cultures, established cell and tissue cultures, meat or meat by-products obtained from food stores, restaurants or packing houses, human or animal parts, including blood, blood products, teeth, hair and body fluids.
- 2) If tissues are obtained from an animal that was sacrificed for a purpose other than the students' project, it may be considered a tissue study. If the animal was euthanized solely for the student's project, the study must be considered a vertebrate animal project and adhere to the vertebrate animal rules for studies conducted at a regulated research institution. (See vertebrate animal rules, pg 16.)
- 3) Human tissue studies where the tissue samples can be identified with a specific person must have IRB review and informed consent. Students using their own tissues are exempt from this requirement.
- 4) All tissues must be handled in accordance with standards and guidelines set forth in Occupational Safety and Health Act, 29CFR, Subpart Z. All human and vertebrate tissue should be handled as though it were potentially infectious. Universal precautions must be used to prevent contact with blood or other potentially infectious materials in human and animal tissues. Lab coats, gloves and other appropriate protective items must be worn and the worksite maintained in a clean and sanitary condition. Any tissue or instruments with the potential of containing bloodborne pathogens (eg. blood, blood products, tissues which would release blood when compressed, blood contaminated instruments) must be incinerated or autoclaved after use in order to effectively destroy bloodborne pathogens.
- 5) All tissue studies must be conducted under the supervision of a Designated Supervisor.
- 6) The following forms are required:
 - a. **Research Plan (1A)**
 - b. **Research Plan Attachment**
 - c. **Approval Form (1B)**
 - d. **Regulated Research Institution Form (1C)** - if applicable
 - e. **Human and Vertebrate Animal Tissue Form (6)**
 - f. **Designated Supervisor Form (3)**

Sources of Information

OSHA
Occupational Health and Safety Administration

<http://www.osha.gov/>

The link "Laws, Regulations, and Interpretations" provides a comprehensive and easy to use reference for current OSHA standards and enforcement-related information.

American Type Culture Collection
1081 University Boulevard
Manassas, VA 20110-2209
(703) 365-2700
(800) 638-6597 (US, Canada, & Puerto Rico)
In the United States: <http://www.atcc.org>
In Europe: <http://lgc.co.uk>

❖ Pathogenic and Potentially Pathogenic Agents ❖

Students may do research involving pathogenic agents as long as the students adhere to federal regulations and guidelines, which are designed to protect the safety of researchers. Carelessness and improper techniques in working with pathogenic and non-pathogenic agents can lead to laboratory- and/or field-contracted infections.

Rules

- 1) Research involving pathogenic or potentially pathogenic agents (humans, vertebrate animals and plants) must be approved by a Scientific Review Committee (SRC) before experimentation begins.
- 2) **Pathogenic or potentially- pathogenic agents** are any organisms that have or may have the ability to cause disease in humans, vertebrate animals or plants. Pathogenic or potentially pathogenic agents include bacteria, viruses, viroids, prions, rickettsia, fungi, or parasites, etc. When using pathogenic agents, student researchers are required to follow standard microbiological practices, as defined in *Biosafety in Microbiological and Biomedical Laboratories*.

Organisms collected and cultured from any environment during student research projects, should be considered potentially pathogenic. Raw or partially-processed human or animal waste is considered to contain potentially-pathogenic agents (Agricultural use of animal waste as fertilizer is exempt). *E. coli* strain K12 and Baker's and brewer's yeasts are not considered to be pathogens.

Purchased cultures certified by the supplier as being non-pathogenic must be identified with full name, source and ATCC identification number or written documentation from the supplier in Research Plan (1A). (See www.atcc.org for the pathogenicity and for ATCC identification number.)

- 3) Student research with pathogenic agents may be performed **only** under the direct supervision of an experienced Qualified Scientist or Designated Supervisor in an institutional laboratory, including a school if facilities are adequate and appropriate. **Studies involving pathogenic agents or potential pathogens are prohibited in a home environment, but specimens may be collected at home.**
- 4) Studies intended to produce bacteria with multiple antibiotic resistance are prohibited. Studies on existing resistant microorganisms are acceptable if done under direct supervision at a regulated research institution, but not in a high school.
- 5) All cultured materials must be autoclaved or incinerated at the end of experimentation.
- 6) Any proposed changes in the Research Plan (1A) and Attachment by the student after initial SRC approval must have subsequent SRC approval before such changes are made and before experimentation resumes.

- 7) The following forms are required:
 - a. **Research Plan (1A)**
 - b. **Research Plan Attachment**
 - c. **Approval Form (1B)**
 - d. **Regulated Research Institution Form (1C)** - if applicable
 - e. **Qualified Scientist (2)**
 - f. **Designated Supervisor Form (3)** - if applicable

Sources of Information

Microorganisms for Education Website

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

Biosafety in Microbiological and Biomedical Laboratories

(*BMBL*) - 4th Edition. Published by CDC-NIH, To order contact:

Office of Health and Safety

Centers for Disease Control and Prevention

1600 Clifton Road, NE Mailstop F05

Atlanta, GA 30333

<http://www.cdc.gov/od/ohs/biosfty/biosfty.htm>

Bergey's Manual of Systematic Bacteriology (four volumes).

(1984, 1986, 1989), Baltimore: Williams & Wilkens.

To order:

phone: (301) 223-2403 or (800) 638-3030

<http://www.lww.com> or <http://www.cme.msu.edu/bergeys/>

American Type Culture Collection

(703) 365-2700; 1(800) 638-6597 (US, Canada, & Puerto Rico)

<http://www.atcc.org>

The Mad Scientist Network at Washington University School of Medicine: <http://www.madsci.org>.

❖ Controlled Substances ❖

Controlled substances, including DEA classed substances, prescription drugs, consumable ethyl alcohol, and tobacco, must be acquired and used according to existing local, state and federal laws.

Rules

- 1) Research involving controlled substances must be approved by a Scientific Review Committee (SRC) before experimentation begins.
- 2) Student researchers must adhere to all local, state, U.S. federal and country regulations governing controlled substances. For further information, contact the regulatory agencies listed below.
- 3) Production of consumable ethyl alcohol is federally regulated and students must contact the Bureau of Alcohol, Tobacco and Firearms for regulations (see below).
- 4) Only under the direct supervision of a Qualified Scientist may students use any federally-controlled medications, including prescriptions and experimental substances, in their research. Student research with consumable ethyl alcohol, tobacco or explosive materials may only be performed under the direct supervision of a Designated Supervisor.
- 5) Students under 21 are prohibited by federal and most state laws from purchasing and/or handling explosive materials, including smokeless powder or black powder for science projects. For further regulations, contact the Firearms & Explosives Division of the Bureau of Alcohol, Tobacco, and Firearms listed below.
- 6) Any proposed changes in the Research Plan (1A) and Attachment by the student after initial SRC approval must have subsequent SRC approval before such changes are made and before experimentation resumes.
- 7) The following forms are required:
 - a. **Research Plan (1A)**
 - b. **Research Plan Attachment**
 - c. **Approval Form (1B)**
 - d. **Regulated Research Institution Form (1C)** - if applicable
 - e. **Designated Supervisor Form (3) and/or Qualified Scientist Form (2)**

Sources of Information

Prescription Drugs

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402
(202) 512-1800
http://www.access.gpo.gov/su_docs

Alcohol, Tobacco and Firearms

The Bureau of Alcohol, Tobacco and Firearms
650 Massachusetts Ave., N.W.
Washington, DC 20226
<http://www.atf.treas.gov>

Distilled Spirits and Tobacco Branch - (202) 927-5000
Firearms & Explosives Division - (202) 927-8300

Narcotics and Addictive Drugs

The Drug Enforcement Administration*
Information Services Section
2401 Jefferson Davis Hwy., Alexandria, VA 22301
Washington, DC 20537
phone: (202) 307-7255
<http://www.usdoj.gov/dea>

*Contact appropriate state agencies concerning additional regulations.

❖ Recombinant DNA (rDNA) ❖

(Applies to all recombinant studies regardless of host)

The ISEF-Affiliated Fair/Intel ISEF, following federal regulations, allows students to conduct recombinant DNA (rDNA) research. When using rDNA and host organisms, students and supervising adults are urged to proceed in a safe and responsible manner in the laboratory.

Rules

- 1) All student research proposals involving rDNA must be reviewed and approved by a Scientific Review Committee (SRC) before experimentation begins.
- 2) Student researchers working with any microorganisms must always follow standard microbiological practices.
- 3) The Intel ISEF adheres to NIH Guidelines and accepts the following definitions as recombinant DNA molecules:
 - a) Molecules that are constructed outside living cells by joining natural or synthetic DNA segments to DNA molecules that can replicate in a living cell.
 - b) Molecules that result from the replication of those described above.
- 4) Students may conduct studies on both exempt and non-exempt rDNA and host organisms. (The International Rules generally follow the NABT guidelines.)
 - a) Nonexempt rDNA studies must be conducted in a federally regulated research institution (e.g., university lab, medical center, NIH, etc.) under the direct supervision of a Qualified Scientist. Copies of the institution's review and approval forms must accompany the required ISEF forms to the ISEF-Affiliated Fair for the SRC to review after experimentation but before competition.
 - b) Exempt rDNA studies may be conducted in non-federally regulated laboratories, including school laboratories, under the direct supervision of a trained teacher, Qualified Scientist and/or Designated Supervisor and must follow federal regulations.
 - (1) Exempt host organisms include the following: bacterium *Escherichia*, bacterium *Bacillus subtilis*, and yeast *Saccharomyces cerevesiae*.
 - (2) Exempt DNA insert molecules include the following: (a) DNA molecules that are not in the DNA of organisms or viruses, (b) DNA from single non-chromosomal or viral sources, and (c) DNA that is entirely from a prokaryotic host, including its indigenous plasmids or viruses when propagated only in the host.
 - (3) The following DNA molecules and host organisms are recommended: (a) DNA molecules: vectors (pAMP, pKAN, pUC, pBR322, M13), (b) host organisms: *E. coli* K-12 strains: MM 294, HB 101, JM 101, and (c) DNA inserts; *Bacteriophage lambda*, *Bacteriophage T4*, *E. coli* sequences, recombinants of any of the above listed plasmids.
- 5) Any proposed changes in the Research Plan (1A) and Attachment by the student after initial SRC approval must have subsequent SRC approval before such changes are made and before experimentation resumes.
- 6) The following forms are required:
 - a. **Research Plan (1A)**
 - b. **Research Plan Attachment**
 - c. **Approval Form (1B)**
 - d. **Regulated Research Institution Form (1C)** - if applicable
 - f. **Qualified Scientist Form (2)** - if non-exempt study
 - g. **Designated Supervisor Form (3)** - if exempt study
- c) Important Restrictions:
 - i. **Studies intended to produce bacteria with multiple antibiotic resistance are prohibited.**
 - ii. Recombinants containing DNA coding for oncogenes or other human, plant or animal toxins (including viruses) cannot be made and/or propagated.
 - iii. Students **should not** handle ethidium bromide or gels stained with ethidium bromide. Any handling of ethidium bromide **should be done** by qualified laboratory personnel, not the student.

Sources of Information

NIH Guidelines for Research Involving Recombinant DNA Molecules. Published by National Institutes of Health.
<http://www4.od.nih.gov/oba/>

Biosafety in Microbiological and Biomedical Laboratories (BMBL) - 4th Edition. Published by CDC-NIH
<http://www.cdc.gov/od/ohs/biosfty/biosfty.htm>

Microorganisms for Education Website
<http://www.science-projects.com/safemicrobes.htm>

The Mad Scientist Network at Washington University School of Medicine: <http://www.madsci.org>.

❖ Hazardous Substances or Devices ❖

The ISEF Affiliated Fair/Intel ISEF allows students to conduct research involving hazardous substances or devices as long as students adhere to federal and state regulations and guidelines which are designed to protect the safety of researchers.

Rules

- 1) The use of hazardous chemicals and equipment, firearms, radioactive substances and radiation require proper supervision by a Designated Supervisor. The Designated Supervisor must be directly responsible for overseeing student experimentation.
- 2) Student researchers working with hazardous substances or devices must follow proper safety procedures for each chemical or device used in the research. Extra precautions should be taken in working with flammable, explosive or highly toxic chemicals, chemical mixtures found in pesticides, and mutagens or carcinogens.
- 3) For all research requiring a Federal and/or State Permit, the student/supervisor will be expected to have the permit prior to the onset of experimentation. A copy of the permit must be submitted for review to the ISEF-Affiliated Fair SRC along with the other appropriate forms after experimentation but prior to competition.
- 4) Use of radiation and radioactive substances are tightly regulated. Students must strictly adhere to safety standards of the authorized institution where such substances/devices are used in the research.
- 5) Differentiation between hazardous and non-hazardous chemicals can best be determined by utilizing the Materials Safety Data Sheets (MSDS).
- 6) The following forms are required:
 - a. **Research Plan (1A)**
 - b. **Research Plan Attachment**
 - c. **Approval Form (1B)**
 - d. **Regulated Research Institution Form (1C)** - if applicable
 - e. **Designated Supervisor Form (3)**

Sources of Information

Safety in Academic Chemistry Laboratories, 1995.
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) 872-4554 or 1-800-227-5558
email: oss@acs.org
<http://pubs.acs.org/>

Material Safety Data Sheets (MSDS)
MSDS should be collected by your laboratory or available from the manufacturer. The internet also has a range of free resources:
<http://www.ilpi.com/msds/index.html>

PUB 8-1.7 - Guidelines for Laser Safety and Hazard Assessment

STD 1-4.1 - OSHA Coverage of Ionizing Radiation Sources Not Covered by Atomic Energy Act of 1954
Available from:
OSHA Publications
P.O. Box 37535
Washington, DC 20013-7535
phone: (202) 693-1888; fax: (202) 693-2498
<http://www.osha.gov>

U.S. Nuclear Regulatory Commission
Material Safety and Inspection Branch
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738
phone: (301) 415-7000; (800) 368-5642
<http://www.nrc.gov>

Local Police Department or State Police
The Bureau of Alcohol, Tobacco and Firearms, Rm 5100
650 Massachusetts Ave., NW,
Washington, DC 20226
Firearms & Explosives Division:
phone: (202) 927-8300
<http://www.atf.treas.gov>

The Mad Scientist Network at Washington University
School of Medicine: <http://www.madsci.org>.

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 should be written on the Official Abstract and Certification Form as provided by Science Service. The abstract **should include:**

- a) *purpose of the experiment*
- b) *procedures used,*
- c) *data, and*
- d) *conclusions.*

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

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

Completing the Certification

At the bottom of the Abstract & Certification form there are four questions regarding the research that the student performed. Please read each carefully, answer appropriately, and sign in the signature box to certify your answers. The Intel ISEF Scientific Research Committee will review and approve the abstract and answers to the questions.

Revisions or questions will be resolved via an SRC appointment on site at the Intel ISEF. Please bring a 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.

Intel ISEF SAMPLE ABSTRACT & CERTIFICATION

<p>TITLE _____</p> <p>Finalist's Name _____</p> <p>School Name, City and State, Country _____</p> <hr/> <p>Start Typing the Body of Your Abstract Here Beginning at the Left Margin</p>	<p>Category Pick one only-- mark an "X" in box at right</p>
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<p>1. As a part of this research project, the student directly handled, manipulated, or interacted with (check all that apply)</p> <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> human subjects</td> <td><input type="checkbox"/> pathogenic agents</td> <td><input type="checkbox"/> recombinant DNA</td> </tr> <tr> <td><input type="checkbox"/> vertebrate animals</td> <td><input type="checkbox"/> controlled substances</td> <td><input type="checkbox"/> human/animal tissue</td> </tr> </table> <p>2. Student independently performed all procedures as outlined in this abstract. <input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>3. This project was conducted at a Regulated Research Institution. <input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>4. This project is a continuation. <input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>5. My display board includes photographs/visual depictions of humans (other than myself or my family): <input type="checkbox"/> yes <input type="checkbox"/> no</p>	<input type="checkbox"/> human subjects	<input type="checkbox"/> pathogenic agents	<input type="checkbox"/> recombinant DNA	<input type="checkbox"/> vertebrate animals	<input type="checkbox"/> controlled substances	<input type="checkbox"/> human/animal tissue	<table style="width: 100%; border: none;"> <tr><td>Behavioral and Social Science</td><td><input type="checkbox"/></td></tr> <tr><td>Biochemistry</td><td><input type="checkbox"/></td></tr> <tr><td>Botany</td><td><input type="checkbox"/></td></tr> <tr><td>Chemistry</td><td><input type="checkbox"/></td></tr> <tr><td>Computers</td><td><input type="checkbox"/></td></tr> <tr><td>Earth and Space Sciences</td><td><input type="checkbox"/></td></tr> <tr><td>Engineering</td><td><input type="checkbox"/></td></tr> <tr><td>Environmental Sciences</td><td><input type="checkbox"/></td></tr> <tr><td>Gerontology</td><td><input type="checkbox"/></td></tr> <tr><td>Mathematics</td><td><input type="checkbox"/></td></tr> <tr><td>Medicine and Health</td><td><input type="checkbox"/></td></tr> <tr><td>Microbiology</td><td><input type="checkbox"/></td></tr> <tr><td>Physics</td><td><input type="checkbox"/></td></tr> <tr><td>Zoology</td><td><input type="checkbox"/></td></tr> </table>	Behavioral and Social Science	<input type="checkbox"/>	Biochemistry	<input type="checkbox"/>	Botany	<input type="checkbox"/>	Chemistry	<input type="checkbox"/>	Computers	<input type="checkbox"/>	Earth and Space Sciences	<input type="checkbox"/>	Engineering	<input type="checkbox"/>	Environmental Sciences	<input type="checkbox"/>	Gerontology	<input type="checkbox"/>	Mathematics	<input type="checkbox"/>	Medicine and Health	<input type="checkbox"/>	Microbiology	<input type="checkbox"/>	Physics	<input type="checkbox"/>	Zoology	<input type="checkbox"/>
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I/We hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I/We also attest that the above properly reflects my/our own work.

Finalist or Team Leader Signature

Date

FOR INTEL ISEF OFFICIAL USE ONLY

This embossed seal attests that this project is in compliance with all federal and state laws and regulations and that all appropriate reviews and approvals have been obtained including the final clearance by the Intel ISEF Scientific Review Committee.

Sample Intel ISEF Official Abstract & Certification

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.

❖ **Documentation** ❖

International Rules for Precollege Science Research: Guidelines for Science & Engineering Fairs

2004 - May 2005