The Preliminary Round

The Finals Round

Intel ISEF

New York City Science & Engineering Fair

Guidelines & Application Forms 2019

### Important Dates

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Introduction

The New York City Science and Engineering Fair (NYCSEF), sponsored by the New York City Department of Education and the City University of New York, is the largest city-wide research competition for high school students. Each year, approximately 800 students submit applications to present their research to a panel of STEM professionals to compete for a variety of cash and prizes. Top researchers from various categories will be selected to represent NYC at the Intel International Science and Engineering Fair (ISEF) in May.

NYCSEF is an ISEF-affiliated regional fair and as such is governed by the ISEF rules and guidelines outlined for pre-college research. These rules and regulations were developed to provide guidelines for acceptable areas of pre-college research for students by protecting the rights and welfare of the student researcher and human subjects, protecting the health and well-being of vertebrate animal subjects, addressing environmental concerns, and supporting safe laboratory practices.

In some cases, the NYCSEF rules and guidelines may differ from those stated by the Intel ISEF competition, particularly those pertaining to student project displays for NYCSEF events. Complete rules and guidelines for the Intel ISEF can be found at https://student.societyforscience.org/international-rules-pre-college-science-research. Students and sponsoring teachers are encouraged to take the time to review these guidelines PRIOR to the start of any research project, the NYCSEF application deadline, and/or event dates.

Any questions or concerns should be directed to NYCSEF staff or the NYCSEF Scientific Review Committee (SRC) by email at <nycsef@cuny.edu>.

NYCSEF Application Addendums

It is recommended that students and associated adults review the appropriate rules and guidelines as it relates to the specific research project.

- **New Category:** The categories of Mathematics and Computer Science have been combined to form the new category of Computational Science, see pg. 27 of the NYCSEF Guidelines for more information.

- **Vertebrate animals:** Refer to pg.10 Rule 6 of the NYCSEF Guidelines – 15% is the maximum permissible weight loss for experimental animals compared to control group.

- **Human Participants:** NYCSEF RULE: For incomplete or invalid Human Participants Forms - students will be required to submit a letter from each person associated with the project’s IRB, stating that they have reviewed the project.
New ISEF rules for Human Participants involvement in student designed invention, prototype, computer application & Engineering/Design project – See pg. 8 of the NYCSEF Guidelines

- **NEW** Engineering Projects Guide: See p. 20 of the NYCSEF Guidelines – New Section. Provides checklist for hazardous chemicals, substances, devices; human participants; vertebrate animals; PHBAs.

- The Regulated Research Institution Form 3 is now a 2-page document. Refer to pages 34-35 of the NYCSEF Guidelines.

NYCSEF Extra’s

APPLICATION SUBMISSION INFORMATION: Students must complete **BOTH** the online application and mail-in application forms for consideration to the fair.

For ALL PROJECTS – Students must submit:
1) ONE (1) printout of the completed NYCSEF online application
2) ONE (1) set of the signed NYCSEF supplemental forms (as applicable)
3) TWO (2) copies of the research paper*

All application materials must be **POSTMARKED by December 12, 2018** and mailed to:
NYCSEF
City University of New York
16 Court Street, 3rd Floor
Brooklyn, NY 11241

Finals Round participants only: The research paper on file may be replaced with a new document showing subsequent data collection and updated analyses and findings no later than March 11.

Awards Ceremony Information:
Award winners and ISEF Finalist will be announced at the ceremony. Awardees must be present to receive their award or they forfeit their prize; this includes ISEF Finalists. There will be a mandatory ISEF Finalists meeting immediately following the Awards Ceremony. Contact the NYCSEF office at NYCSEF@cuny.edu for any questions.
Acknowledgements

The New York City Science and Engineering Fair extends a warm thank you to all our sponsors and partners for their generosity and continued support of New York City STEM student research. The New York City Science & Engineering Fair’s lead sponsor is the New York City Department of Education. The City University of New York is the organizer and sponsor.

We are thankful for all of the educators and professionals who volunteer their time and expertise to work with students to discover and explore through the wonder of research. This dedication and support of pre-college activities helps nurture the scientists, mathematicians and engineers of tomorrow.
Follow us!

Join the online NYCSEF community to get fair and STEM-related updates, receive invitations to events and learn about research opportunities.

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Twitter
@officialNYCSEF

#NYCSEF2019
Information for All Projects

The Rules and Regulations described below are for students competing in the New York City Science and Engineering Fair (NYCSEF) and are derived from the Intel ISEF Rules and Guidelines. Note: Some of the rules and regulations that govern competition for the NYCSEF events differ from those used for the Intel ISEF. Questions about the NYCSEF rules and guidelines should be forwarded to the NYCSEF staff.

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 NYCSEF and Intel ISEF-affiliated fairs.

Eligibility / Limitations
1. Any student in grades 9 – 12 or equivalent, enrolled in a New York City public, private, parochial, or home school* who has not reached the age of 21 on, or before, May 1 of the event year is eligible to participate in NYCSEF. *Home school students MUST be registered with the NYCDOE or be a NYC resident.
2. Each student may enter only ONE project summarizing data collection or research findings which cover a maximum of 12 continuous months between January 2018 and May 2019. (See Continuation of Projects for more information, pg.2)
3. Team projects may have a maximum of three members. Team members do not have to be from the same school. All team members must be enrolled in a NYC public, private, or parochial high school and must demonstrate each team member’s contribution to the project. In cases where team members are not from the same school, the teacher of the Team Leader will be designated as the SPONSORING RESEARCH TEACHER and will receive all communication distributed to sponsoring teachers.
4. Projects that are demonstrations, ‘library’ research or informational projects, product testing projects, ‘explanation’ models or kit building examples are not appropriate for competition at NYCSEF.
5. A research project may be a part of a larger study done by professional scientists, but the project presented by the student may only be their portion of the complete study.
6. In order to be considered for ISEF, the student(s) MUST attend both the Preliminary and Finals events.
7. Students eligible to participate in NYCSEF will not be sponsored or permitted to participate in any other Intel ISEF-affiliated fair. Only those students selected as a NYC Finalist will be invited to attend the Intel ISEF in Phoenix, AZ in May 12th-17th, 2019.

General Requirements
1. All students applying to NYCSEF must adhere to all the rules and guidelines as set forth in this document.
2. All projects must adhere to the Ethics Statement above and local, state, county, and US Federal laws, regulations, and permitting conditions.
3. Introduction or disposal of non-native species, pathogens, toxic chemicals or foreign substances into the environment is prohibited.
4. NYCSEF exhibits must adhere to NYCSEF display and safety requirements.
5. It is the responsibility of the student, sponsoring research teacher, and the adult sponsor to check with NYCSEF organizers for any additional restrictions or requirements.

Approval and Documentation
6. BEFORE experimentation begins, an Institutional Review Board (IRB) or Scientific Review Committee (SRC) must review and approve most projects involving human subjects, vertebrate animals, and potentially hazardous biological agents. Please refer to the appropriate sections of the Rules and Guidelines for specific information.
7. Every student must complete the NYCSEF online application, Student Checklist (1A), Project Summary parts 1-4, and Approval Form (1B). These should be reviewed with the Adult Sponsor in order for the Checklist for Adult Sponsor (1) to be completed.
8. A Qualified Scientist is required for all studies involving BSL-2 potentially hazardous biological agents, DEA-controlled substances, more than minimal risk in human subjects and for all vertebrate animal studies.
9. After initial IRB/SRC approval (if required), any proposed changes in the Student Checklist (1A) and Project Summary must be re-approved before laboratory experimentation/data collection resumes.
10. Projects which are continuations and which require IRB/SRC approval must be re-approved prior to experimentation/data collection for the current year.
11. Any continuing project must document that the additional research is new and different, regardless of
Continuation of Projects

1. As in the professional world, research projects may be done that build on previous work done in past years. Students will be judged only on the most recent year’s research. The project year includes data collection and experimentation conducted over a maximum of 12 continuous months from January 2018 – May 2019.

2. Any project based on the student’s prior research could be considered a continuation project including a progression of work within the same field of study. If the current year’s project could not have been done without what was learned from the past year’s research, then it is considered a continuation project for this 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 same methodology and research question with an increase in sample size and/or changes in concentrations are examples of unacceptable continuation projects.

3. Display boards must reflect the results and data collected during the current year only. The project title displayed 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 new construction and drainage systems on surrounding estuaries and wildlife in a given period over time.)
   b. Each consecutive year must demonstrate time-based change.
   c. The display board must be based on collective past conclusive data and its comparison to the current year data set. No raw data from previous years may be displayed.

Note: Retain all previous year’s paperwork in case an SRC requests documentation of experimentation conducted in prior years.

Team Projects

1. Teams may have up to THREE members. Each team should appoint a team leader to coordinate the work and act as a spokesperson. However each member of the team should also be able to serve as spokesperson, be fully involved with the project, articulate their individual contribution to the entire research 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.

2. The Team Leader (Student #1) will be responsible for all communication with NYCSEF and for providing documentation related to the project. Only ONE application needs to be submitted on behalf of the team. Individual team members (Students #1, #2, and if #3) will be responsible for providing any/all personal information as requested by NYCSEF staff (including but not limited to their name, high school they are attending, email address, etc.)

3. Each team member must submit an Approval Form (1B). However, team members must jointly submit the Student Information, Team Information, Project Information, Checklist for Adult Sponsor (1), abstract, Student Checklist (1A), Project Summary Parts 1-4,
scientific research paper, and any other required form pertaining to the research project.

4. Team membership cannot be changed during a given research year (e.g. converting from an individual project to a team project or vice versa) but may be altered in subsequent years. If additional team member(s) leave the team, the remaining team member may present alone but will still compete as a team project.

Non-Inquiry Based Research
Not all areas of study are best served by the scientific (or ‘experimental’) method-based research. Since engineers, inventors, mathematicians, theoretical physicists, and computer programmers have different objectives than other scientists, they often follow a different process in their work. The process that they use to answer a question or solve a problem is different depending on their area of study and may use their own criteria to arrive at a solution.

1. Engineering Projects
These projects often describe how nature works or creates things that never were. An engineering project should state the engineering goals, the development process and the evaluation of improvements. Replications or models of current structures or mechanisms are not acceptable for entry in the NYCSEF competition.

Engineering projects should include the following:
   a. Define a need or improve upon a current design;
   b. Provide background and reference to literature that describes what has already been done and what projects already exist that fill a similar need;
   c. Considers cost, manufacturing, and user requirements;
   d. Tests prototypes or similar model systems.

2. Mathematics & Computer Science Projects
These projects often involve creating and writing new algorithms to solve a problem or improve on an existing algorithm. The projects can also involve proofs, solving equations etc. Simulations, models or ‘virtual reality’ are other areas on which to conduct research.

Math is the language of science and is used to explain existing phenomena or prove new concepts and ideas. Math projects can be broadly placed in two categories: pure math (e.g. knot theory geometry) and applied math (e.g. how do you put out fires in the Rocky Mountains using the cellular automata fire model). Math projects submitted for NYCSEF should be based on a relevant topic in math and describe an intriguing method(s) which compliments the problem.

Solutions of math team- or math Olympiad-type questions are not appropriate; however, extensions that potentially add to the knowledge of mathematics will be considered for this competition.

4. Theoretical Projects
These projects can involve a thought experiment, development of new theories and explanations, concept formation, or designing a mathematical model. Theoretical research often proposes answers or solutions to problems where traditional inquiry methods or experimentation is not possible.

Judging at NYCSEF
Judges evaluate and focus on 1) what the student did in the current year; 2) how well a student followed the scientific, engineering, computer programming, or mathematical methodologies; 3) the detail and accuracy of research; 4) whether experimental procedures were used in the best possible way; and 5) how well the student(s) are able to present the research.

1. Judging Criteria
At NYCSEF, students will be evaluated in two main categories: Scientific Achievement / Accomplishment (How well did the student(s) successfully meet the technical and scientific requirements for his/her project?) and Merit / Individual Accomplishment (How well did the student(s) carry out the project according to his/her ability?). Judges will be asked to measure the creative ability, scientific thought and/or engineering goals, thoroughness, understanding, and clarity of the students when referring to the research project they are presenting.

Examples of questions judges will be asked to consider:
- How much does this project build upon or add to current knowledge in this area, topic, or field?
- How logical was the experimental design?
- Did the research methods directly address the research problem?
- How thorough was the analysis of available data?
- How much initiative did the student have in carrying out the research project?
- How creative were the student’s solutions to the research problem?
- What was the overall comprehension of the topic and supporting information?
- Was the student able to discuss the project clearly?
Judges look for well thought out research. They look at how significant the project is in its field, how thorough the student was, and how much of the experimental thought and design is the student’s own work.

Judges get much of the project information from the poster board, abstract and research paper, but it is the interview that will be the major determination of work. Judges applaud those students who can speak freely and confidently about their work. They simply want to talk with students about their research to see if they have a good grasp of the research project from start to finish.

2. Helpful hints for judging:
   - Greet the judges and introduce yourself.
   - Appearance, good manners, appropriate attire, and enthusiasm for what you are doing will impress the judges.
   - Judges need to see if you understand the basic principles of math, science, engineering, or technology behind your project and topic area.
   - Judges want to know if you have correctly measured and analyzed the data.
   - Judges want to know if you can determine possible sources of error in your project and how you might apply your findings in the ‘real’ world.
   - Judges seek to encourage you in your research efforts and future goals and career in the field.
   - Finally – and most importantly – relax, smile, and enjoy your time to learn from them and your interaction with them. You should be applauded for all your hard work!

Student Research Papers
A student research paper must be submitted, in addition to any relevant forms and paperwork, in order to complete the NYCSEF application. All application materials must be POSTMARKED no later than December 12th, 2018 in order to compete in any of the NYCSEF events.

Student research papers will be used in conjunction with scores received in the Preliminary and Finals rounds to select the top projects that will represent NYC at the Intel ISEF in May. Below are suggestions for the different sections of a research paper. Keep in mind that some suggestions may not apply depending on the nature of the project.

Abstract
The abstract is a critical, informative summary of the significant content and conclusions of the paper. The abstract should not exceed 500 words and should be written in the past tense. The abstract:
- does not include any references to tables or figures in the paper or cited literature;
- does not include detailed descriptions of systems, equipment, or processes.

Introduction
The introduction provides a brief, historical background and description of the work discussed in the paper. The purpose of the investigation is clearly stated and placed in the context of the field of study and contains properly cited references.

This section:
- describes the nature and significance of the research project;
- provides definitions of new or unusual terms, or those having special meaning related to the project.

Materials and Methods
The materials and methods should be written in paragraph form – step listings will not be accepted – and detailed enough to allow any reader to repeat the experimentation if necessary. However, it is not necessary to include every single step (i.e. how many grams of NaCl was added to water – just the final concentration). This section:
- does not contain any results;
- describes any apparatus that was specifically constructed or modified for use in the study;
- could include a flowchart or diagram for clarification of a complex procedure or apparatus.

Results
The results section summarizes the data in narrative form with tables, graphs, and figures. Tables, graphs, and figures should be integrated into text with verbal elaboration and used to make data coherent, encourage comparison, indicate relationships, and simplify complicated information. This section:
- contains tables, graphs, and figures that are clearly labeled with concise captions;
- does not contain ALL of the raw data collected but should highlight the data relevant to the study;
- does not contain any guesses, conclusions, or interpretations based on the data.

Discussion and Conclusions
The discussion section provides an interpretation of results and how it relates to the original hypothesis and project rationale. This section:
• offers possible explanations of the findings;
• provides recommendations for further study and for improving experimentation.

References / Literature Cited
Students should take care to indicate the sources of the information and include in-text citations using either APA or MLA format for citations – not both. References should:
• contain at least five major references from scientifically and academically accepted sources;
• not include encyclopedias or Internet search engines. These are acceptable starting points for gathering background information but should not be the only sources of reference.

Submission Summary
Students should retain ALL original signed NYCSEF application forms – including the student research paper and follow the submission rules detailed on Page ii.

Only students who follow the proper rules and guidelines and submit ALL necessary materials will be eligible to have their application reviewed by the NYCSEF Scientific Review Committee and be considered for competition in any of the NYCSEF events.
Roles and Responsibilities of Students & Adults

The Roles and Responsibilities described below are relevant to all NYCSEF events and may differ from those used by Intel ISEF. Specific roles and responsibilities for individuals involved in the Intel ISEF can be found at <https://student.societyforscience.org/international-rules-pre-college-science-research>.

The Student Researcher(s)
The student researcher is responsible for all aspects of the research project including enlisting any needed supervisory adults (Adult Sponsor, Sponsoring Science/Research Teacher, Qualified Scientist, etc.), obtaining necessary approvals (SRC, IRB, etc.), following the Rules and Guidelines for NYCSEF, and doing the experimentation, engineering, data analysis, etc. involved in the project.

The student must be enrolled in a NYC public, private, parochial, or home school* in grades 9–12 or equivalent and must not have reached the age of 21 by May of the event year. Students may compete as a team of up to 3 members, and can be enrolled in different schools, as long as the schools are ALL located within NYC. *Home school students MUST be registered with the NYCDOE or be a NYC resident.

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 this and future NYCSEF competitions.

The Sponsoring Science/Research Teacher
The Sponsoring Science / Research Teacher is responsible for overseeing the student(s) participation in all aspects of the research project, from the planning phase through the competition phase. The Sponsoring Science/Research Teacher must be an adult or instructor from the applicant’s school. The Sponsoring Science / Research Teacher is required to review all paperwork submitted to NYCSEF by his/her student(s) and sign the Signature Page (see page 28) acknowledging that he/she reviewed the submitted project application. Information concerning student’s application status will also be communicated to the Sponsoring Science/Research Teacher.

For Team Projects, the science / research teacher of the Team Leader (Student #1) will be designated the Sponsoring Science / Research Teacher and will be the primary point of communication between NYCSEF staff and all student members of the research team.

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 ensuring the student’s research is eligible for entry in this competition.

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 Project Summary Parts 1-4 to make sure that: a) experimentation is done within local, state, and federal laws and the NYCSEF rules and guidelines; 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 Project Summary Parts 1-4. Some experiments involve procedures or materials that are regulated by state and federal laws or may not be appropriate for pre-college students. If not thoroughly familiar with the regulations, the Adult Sponsor should help the student enlist the aid of a Qualified Scientist.

The Qualified Scientist
A Qualified Scientist should possess an earned doctoral / professional degree in the area that directly 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.

A student may work with a Qualified Scientist in another city, state or country. In this case, the student must work locally with a Designated Supervisor who has been trained in the techniques the student will use.

Note: The Qualified Scientist, Adult Sponsor, and Sponsoring Science / Research Teacher may be the same person, IF that person is qualified as outlined above.
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 or the Sponsoring Science / Research Teacher may act as the Designated Supervisor provided that he/she directly oversees student experimentation.

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

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. A local IRB should be established at the school level to evaluate human research projects. An IRB at the school or student experimentation level must consist of a minimum of three members. In order to eliminate conflict of interest, the Sponsoring Science / Research Teacher, Adult Sponsor, parents, Qualified Scientist, and/or 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) an educator with experience in subject area, procedures, and/or research being conducted;
b) a school administrator (preferably a principal or assistant principal);
c) and one of the following who is knowledgeable and capable of evaluating the psychological risk involved in a given study: a medical doctor, physician’s assistant, registered nurse, a psychiatrist, 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 (i.e. email, fax, etc.) should be attached to Form 4 and can be used as the signature of that expert.

An IRB should be established at the school level to evaluate human research projects. An IRB at the school or student experimentation level must consist of a minimum of three members. In order to eliminate conflict of interest, the Sponsoring Science / Research Teacher, Adult Sponsor, parents, Qualified Scientist, and/or 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:

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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 (i.e. email, fax, etc.) should be attached to Form 4 and can be used as the signature of that expert.

IRB’s exist at federally regulated institutions (i.e. universities, medical centers, NIH, corrections 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 Sponsoring Science / Research Teacher are responsible for ensuring that the project is appropriate for a pre-college student and adhere to all the NYCSEF, ISEF, local, state, and federal rules.

An IRB generally makes the final determination of risk. However, in reviewing projects just prior to a fair, if the NYCSEF SRC judges a local 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.

The NYCSEF 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 must review and approve all projects before experimentation begins.

Any proposed research involving vertebrates and potentially hazardous biological agents must be reviewed and approved before experimentation. Human studies reviewed and approved by a properly constituted IRB do not have to be reviewed by a SRC until prior to competition. All projects must be reviewed and approved by the NYCSEF SRC for compliance with competition rules and deemed eligible for competition in NYCSEF.

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) an educator with experience in subject area, procedures, and/or research being conducted; and
c) at least one other member with expertise in the area of student research.

In order to eliminate conflict of interest, the Sponsoring Science / Research Teacher, Adult Sponsor, parents, Qualified Scientist, and/or the Designated Supervisor who oversee a specific project must not serve on the SRC reviewing that project. Many projects will require additional expertise to properly evaluate (or 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.

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 are:

a) Institutional Animal Use and Care Committee (IACUC)
b) Institutional Review Board (IRB)
c) Institutional Biosafety Committee (IBC)
d) Embryonic Stem Cell Research Oversight Committee (ESCRRO)
The following rules were developed to help pre-college student researchers adhere to the federal regulations governing professional scientists and to protect the welfare of both human participants and the student researcher. Health and well-being is of the highest priority when students conduct research with human participants.

According to Code of Federal Regulation 45, CFR 46, a human participant is a living individual about whom an investigator conducting research obtains (1) data or samples through intervention or interaction with individuals(s) or (2) identifiable private information.

Examples of projects that are considered “human participant research” include:
- Participants in physical activities (e.g., physical exertion, ingestion of any substance, any medical procedure)
- Psychological, educational and opinion studies (e.g., surveys, questionnaires, tests)
- Studies in which the researcher is the subject of the research
- Testing of student designed invention, prototype or computer application by human participants other than student researcher
- Data/record review projects that include data that are not de-identified/anonymous (e.g., data set that includes name, birth date, phone number or other identifying variables)

Behavioral observations that
a. involve any interaction with the observed individual(s) or where the researcher has modified the environment (e.g., post a sign, place an object).

b. occur in non-public or restricted access settings (e.g., day care setting, doctor’s office).
c. involve the recording of personally identifiable information.

Rules
1. Student researchers must complete ALL elements of the Human Participants portion of the Research Plan/Project Summary Instructions and evaluate and minimize the physical, psychological and privacy risks to their human participants. See Risk Assessment information on page 11 and the online Risk Assessment Guide (https://student.societyforscience.org/human-participants#riskassess) for additional guidance.

2. Student research involving human participants must be reviewed and approved by an Institutional Review Board (IRB) (See page 5) before any interaction (e.g., recruitment, data collection) with human participants may begin. It is the responsibility of the IRB to evaluate potential physical and/or psychological risks of the project and make a determination about whether the project is appropriate for student research and safe for the student researcher and participants.
   a. Projects that are conducted at school, at home or in the community that are not affiliated with a Regulated Research Institution (RRI) must be reviewed and approved by the School IRB before the student may begin recruiting and/or interacting with human participants. The School IRB must assess the risk and document its determination of risk on Form 4.
   b. Projects that are conducted at a Regulated Research Institution (RRI) (e.g., university, hospital, medical center, government lab) must have IRB approval from the RRI. A copy of the IRB approval for the project must be obtained.

3. The student must comply with all determinations made by the School or RRI IRB before beginning any interaction with human participants (e.g., recruitment, data collection).
   a. If the IRB requires a Qualified Scientist (QS), Form 2 must be completed by the QS before any interaction with human participants. The School IRB will review this completed form before approving the project.
   b. If the IRB requires a Designated Supervisor (DS), Form 3 must be completed before any interaction with human participants. The School IRB will review this completed form before approving the project.
   c. See rule #4 below regarding required procedures for obtaining informed consent/assent and/or parental permission.

Participation in research may begin only after research participants have voluntarily given informed consent/assent (in some cases with parental permission). Adult research participants may give their own consent. Research participants under 18 years of age and/or individuals not able to give consent (e.g. developmentally disabled individuals) give their assent, with the parent/guardian providing permission.

The School IRB will determine whether the consent/assent/ parental permission may be a) verbal or implicit or b) must be written. See the Risk Assessment information on page 9 and the online Risk Assessment Guide (https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/Resources/Risk-Assessment-Guide.pdf) for further explanation of informed consent.
   a. Informed consent requires that the researcher provides complete information to the participant (and where applicable, parents or guardians) about the risks and benefits associated with participation in the research study, which then allows the participants and parents or guardians to make an informed decision about whether or not to participate.
   b. Participants must be informed that their participation is voluntary and that they are free to stop participating at any time (i.e., they may participate or decline to participate, with no adverse consequences of non-participation or aborted participation).
   c. Informed consent may not involve coercion.
   d. When written parental permission is required and the study includes a survey, the survey must be attached to the consent form.
   e. The student researcher may request that the IRB waive the requirement for written informed consent/parental permission in his/her research plan if the project meets specific requirements. See section on IRB waivers for more information about situations in which written parental permission and/or written informed consent can be waived by the IRB.

5. The research study must be in compliance with all privacy laws (e.g., U.S. Family Educational Rights and Privacy Act
6. Students are prohibited from administering medication and/or performing medical procedures on human participants. A student may observe and collect data for analysis of medical procedures and medication administration only under the direct supervision of a medical professional. This medical professional must be named in the research protocol approved by the IRB. The IRB must also confirm that the student is not violating the medical practice act of the state or country in which he/she is conducting the research.

7. Student researchers may NOT publish or display information in a report that identifies the human participants directly or through identifiers linked to the participants (including photographs) without the written consent of the participant(s) (Public Health Service Act, 42, USC 241 (d)).

8. All published instruments 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. Studies that involve the collection of data via use of the internet (e.g., email, web-based surveys) are allowed, but researchers should be aware that they can pose challenges in a) collecting anonymous data, b) obtaining informed consent and c) ensuring that participants are of the appropriate age to give informed consent. See the Online Survey Consent Procedures (https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/Resources/Online-Survey-Consent-Procedures.pdf).

10. After initial IRB approval, a student with any proposed changes in the Research Plan must repeat the approval process and regain approval before resuming interaction (recruitment, data collection) with human participants.

11. After experimentation and before competition, the Affiliated Fair SRC will review for compliance with all rules.

12. The following forms are required for studies involving human participants:
   a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/Project Summary, and Approval Form (1B)
   b. Human Participants Form (4) or IRB approval from an RRI and all applicable consents and survey(s)
   c. Regulated Research Institution Form (1C), when applicable
   d. Qualified Scientist Form (2), when applicable
   e. Risk Assessment (3) when applicable

IRB Waiver of Written Informed Consent/Parental Permission

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

1. Research involving normal educational practices

2. Research on individual or group behavior or characteristics of individuals where the researcher does not manipulate the participants’ behavior and the study does not involve more than minimal risk.

3. Surveys, questionnaires, or activities that are determined by the IRB to involve perception, cognition, or game theory, etc. and that do NOT involve gathering personal information, invasion of privacy or potential for emotional distress.

4. 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 than those ordinarily encountered in DAILY LIFE or during performance of routine physical activities.

If there is any uncertainty regarding the appropriateness of waiving written informed consent/assent/parental permission, it is strongly recommended that documentation of written informed consent/assent/parental permission be obtained.

Human Participant Involvement in Student-designed Invention, Prototype, Computer Application & Engineering/Design Projects

Student-designed invention, prototype, computer application and engineering/design projects that involve testing of the invention by any human participant require attention to the potential risks to the individual(s) testing or trying out the invention/prototype.

1. IRB review and pre-approval is necessary when the student-designed invention, prototype, application, etc. is tested by human participants other than the student researcher(s). This includes surveys conducted regarding potential use, review of the product and/or opinions regarding the project.

2. Projects in which the invention, prototype or project involves a medical diagnosis or intervention (as defined by the FDA or Medical Practices Act) must be conducted at a Regulated Research Institution (RRI) with a Qualified Scientist and receive IRB Approval from the Institution.

3. A Risk Assessment Form 3 is recommended for all student-designed inventions or prototypes.

Exempt Studies (Do Not Require IRB Preapproval or Human Participants Paperwork)

Some studies involving humans are exempt from IRB pre-approval or additional human participant forms. Exempt projects for the Intel ISEF and affiliated fairs are:

1. Student-designed Invention, Prototype, Computer Applications or Engineering/Design Project in which the student researcher is the only person testing the invention, prototype or computer application and the testing does not pose a health or safety hazard. It is recommended that a Risk Assessment Form (3) be completed.

2. Data/record review studies (e.g., baseball statistics, crime statistics) in which the data are taken from preexisting data sets that are publicly available and/or published and do not involve any interaction with humans or the collection of any data from a human participant for the purpose of the student’s research project.
3. Behavioral observations of unrestricted, public settings (e.g., shopping mall, public park) in which all of the following apply:
   a. the researcher has no interaction with the individuals being observed
   b. the researcher does not manipulate the environment in any way and
   c. the researcher does not record any personally identifiable data.

4. Projects in which the student receives pre-existing/retrospective data in a de-identified/anonymous format which complies with both of the following conditions:
   a. the professional providing the data certifies in writing that the data have been appropriately de-identified before being given to the student researcher and are in compliance with all privacy and HIPAA laws, and
   b. the affiliated fair SRC ensures that the data were appropriately de-identified by review of the written documentation provided by the supervising adult(s).

5. NYCSEF and the SRC reserve the right to determine the appropriateness of survey content and administration for participation in the fair. Here, appropriateness refers to, but is not limited to target population and survey content: inclusive of language, images, etc. that are viewed by study/survey participants.

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**Human Participant Risk Assessment**

Use this information to help determine the level of risk involved in a study involving human participants.

All human participant projects are considered to have some level of risk.

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 everyday life or during performance of routine physical or psychological examinations or tests.

More than minimal risk exists when the possibility of physical or psychological harm or harm related to breach of confidentiality or invasion of privacy is greater than what is typically encountered in everyday life. Most of these studies require documented informed consent or minor assent with the permission of parent or guardian (as applicable).

1. **Examples of Greater than Minimal Physical Risk**
   a. Exercise other than ordinarily encountered in everyday life
   b. Ingestion, tasting, smelling, or application of a substance. However, ingestion or tasting projects that involve commonly available food or drink will be evaluated by the IRB which determines risk level based upon the nature of the study and local norms.
   c. Exposure to any potentially hazardous material.

2. **Examples of Greater than Minimal Psychological Risk**
   A research activity (e.g. survey, questionnaire, viewing of stimuli) or experimental condition that could potentially result in emotional stress. Some examples include: answering questions related to personal experiences such as sexual or physical abuse, divorce, depression, anxiety; answering questions that could result in feelings of depression, anxiety, or low self esteem; or viewing violent or distressing video images.

3. **Privacy Concerns**
   a. The student researcher and IRB must consider whether an activity could potentially result in negative consequences for the participant due to invasion of privacy or breach of confidentiality. Protecting confidentiality requires measures to ensure that identifiable research data are not disclosed to the public or unauthorized individuals.
   b. Risk level can be reduced by protecting confidentiality or collecting data that is strictly anonymous. This requires the collection of research in such a way that it is impossible to connect research data with the individual who provided the data.

4. **Risk Groups**
   If the research study includes participants from any of the following groups, the IRB and student research must consider whether the nature of the study requires special protections or accommodations:
   a. Any member of a group that is naturally at-risk (e.g. pregnant women, developmentally disabled persons, economically or educationally disadvantaged persons, individuals with diseases such as cancer, asthma, diabetes, AIDS, dyslexia, cardiac disorders, psychiatric disorders, learning disorders, etc.)
   b. Special groups that are protected by federal regulations or guidelines (e.g. children/minors, prisoners, pregnant women, students receiving services under the Individuals with Disabilities Education Act (IDEA).

The following rules were developed to help pre-college student researchers adhere to the federal regulations governing professional scientists and to protect the welfare of both animal subjects and the student researcher. Health and well-being is of high priority when students conduct research with animal subjects.

The Society strongly endorses the use of non-animal research methods and encourages students to use alternatives to animal research, which must be explored and discussed in the research plan. The guiding principles for the use of animals in research include the following “Four R’s”:

- **Replace** vertebrate animals with invertebrates, lower life forms, tissue/cell cultures and/or computer simulations where possible.
- **Reduce** the number of animals without compromising statistical validity.
- **Refine** the experimental protocol to minimize pain or distress to the animals.
- **Respect** animals and their contribution to research.

If the use of vertebrate animals is necessary, students must consider additional alterantives to reduce and refine the use of animals.

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

A project is considered a tissue study and not a vertebrate animal study if tissue is obtained from an animal that was euthanized for a purpose other than the student’s project. (Use of tissues obtained from research conducted at a Regulated Research Institution requires a copy of an IACUC certification with the name of the research institution, the title of the study, the IACUC approval number and date of IACUC approval.) Intissue studies, a student may observe the vertebrate study, but may not manipulate or have any direct involvement in the vertebrate animal experimental procedures.

**Vertebrate animals, as covered by these rules, are defined as:**
1. Live, nonhuman vertebrate mammalian embryos or fetuses
2. Tadpoles
3. Bird and reptile eggs starting three days (72 hours) prior to hatching
4. All other nonhuman vertebrates (including fish) at hatching or birth.
   Exception: Because of their delayed cognitive neural development, zebrafish embryos may be used up to seven days (168 hours) post-fertilization.

**Rules for ALL Vertebrate Animal Studies**

1. All vertebrate animal studies must have a research plan that includes:
   a. Justification why animals must be used, including the reasons for the choice of species, the source of animals and the number of animals to be used; description, explanation, or identification of alternatives to animal use that were considered, and the reasons these alternatives were unacceptable; explanation of the potential impact or contribution this research may have on the broad fields of biology or medicine.
   b. Description of how the animals will be used. Include methods and procedures, such as experimental design and data analysis; description of the procedures that will minimize the potential for discomfort, distress, pain and injury to the animals during the course of experimentation; identification of the species, strain, sex, age, weight, source and number of animals proposed for use.

2. All vertebrate animal studies must be reviewed and approved before experimentation begins. An Institutional Animal Care and Use Committee, known as an IACUC, is the institutional animal oversight review and approval body for all animal studies at a Regulated Research Institution. The local OR affiliated fair SRC serves in this capacity for vertebrate animals studies performed in a school, home or field. Any SRC serving in this capacity must include a veterinarian or an animal care provider with training and/or experience in the species being studied.

3. Students performing vertebrate animal research must satisfy US federal law as well as local, state, and country laws and regulations of the jurisdiction in which research is performed.

4. Research projects which cause more than momentary or slight pain or distress are prohibited. Any illness or unexpected weight loss must be investigated and a veterinarian consulted to receive required medical care. This investigation must be documented by the Qualified Scientist or Designated Supervisor, who is qualified to determine the illness, or by a veterinarian. If the illness or distress is caused by the study, the experiment must be terminated immediately.

5. No vertebrate animal deaths due to the experimental procedures are permitted in any group or subgroup.
   a. Studies that are designed or anticipated to cause vertebrate animal death are prohibited.
   b. Any death that occurs must be investigated by a veterinarian, the Qualified Scientist or the Designated Supervisor who is qualified to determine if the cause of death was incidental or due to the experimental procedures. The project must be suspended until the cause is determined and then the results must be documented in writing.
   c. If death was the result of the experimental procedure, the study must be terminated, and the study will not qualify for competition.

6. All animals must be monitored for signs of distress. Because significant weight loss is one sign of stress, weight must be recorded at least weekly with 15% being the maximum permissible weight loss or growth retardation (compared to controls) of any experimental or control animal. Additionally, body conditioning scoring (BCS) systems are available for most species of animals utilized in research and are an objective method for assessing the overall health status of the research subject, with or without weight loss. A BCS system should be included in the design of any study utilizing live vertebrate animals and results regularly recorded.

7. Students are prohibited from designing or participating in an experiment associated with the following types of studies on vertebrate animals:
   a. Induced toxicity studies with known toxic substances that could cause pain, distress, or death, including but
not limited to alcohol, acid rain, pesticides, or heavy metals or studies with the intent to study toxic effects of a substance on a vertebrate animal.

b. Behavioral experiments using conditioning with aversive stimuli, mother/infant separation or induced helplessness.

c. Studies of pain.

d. Predator/vertebrate prey experiments.

8. Justification is required for an experimental design that involves food or fluid restriction and must be appropriate to the species. If the restriction exceeds 18 hours, the project must be reviewed and approved by an IACUC and conducted at a Regulated Research Institution (RRI).

9. Animals may not be captured from or released into the wild without approval of authorized wildlife or other regulatory officials. All appropriate methods and precautions must be used to decrease stress. Fish may be obtained from the wild only if the researcher releases the fish unharmed, has the proper license, and adheres to state, local and national fishing laws and regulations. The use of electrofishing is permissible only if conducted by a trained supervisor; students are prohibited from performing electrofishing.

10. A Qualified Scientist or Designated Supervisor must directly supervise all research involving vertebrate animals, except for observational studies.

11. After initial SRC approval, a student with any proposed changes in the Research Plan/Project Summary of the project must repeat the approval process before laboratory experimentation/data collection resumes.

Exempt Studies (Do Not Require SRC Preapproval)

1. Studies involving behavioral observations of animals are exempt from prior SRC review if ALL of the following apply:
   a. There is no interaction with the animals being observed,
   b. There is no manipulation of the animal environment in any way, and
   c. The study meets all federal and state agriculture, fish, game and wildlife laws and regulations.

A. Additional Rules for Projects Conducted at School/Home/Field

Vertebrate animal studies may be conducted at a home, school, farm, ranch, in the field, etc. This includes:
1. Studies of animals in their natural environment.
2. Studies of animals in zoological parks.
3. Studies of livestock that use standard agricultural practices.
4. Studies of fish that use standard aquaculture practices

These projects must be reviewed and approved by an SRC in which one member is either a veterinarian and/or an animal care provider/expert with training and/or experience in the species being studied.

1. These projects must adhere to BOTH of the following guidelines:
   a. The research involves only agricultural, behavioral, observational or supplemental nutritional studies on animals.

   AND

   b. The research involves only non-invasive and non-intrusive methods that do not negatively affect an animal’s health or well-being.

All vertebrate animal studies that do not meet the criteria in Section A. must be conducted in a Regulated Research Institution (see Section B).

2. Animals must be treated kindly and cared for properly. Animals must be housed in a clean, ventilated, comfortable environment appropriate for the species. 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. Any of the following U.S. documents provide further guidance for animal husbandry:
   • 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)
   • Quality Assurance Manuals (for the appropriate species)

3. The local or affiliated fair Scientific Review Committee must determine if a veterinarian’s certification of the research and animal husbandry plan is required. This certification, as well as SRC approval, is required before experimentation and is documented on Vertebrate Animal Form 5A. A veterinarian must certify experiments that involve supplemental nutrition, administration of prescription drugs and/or activities that would not be ordinarily encountered in the animal’s daily life.

4. If an illness or emergency occurs, the affected animal(s) must receive proper medical or nursing care that is directed by a veterinarian. A student researcher must stop experimentation if there is unexpected 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. If death is the result of the experimental procedure, the study must be terminated, and the study will not qualify for competition.

5. The final disposition of the animals must be conducted in a responsible and ethical manner, and must be described on Vertebrate Animal Form 5A.

6. Euthanasia for tissue removal and/or pathological analysis is not permitted for a project conducted in a school/home/field site.

7. Livestock or fish raised for food using standard agricultural/aquacultural production practices may be euthanized by a qualified adult for carcass evaluation.

8. The following forms are required:
   a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/Project Summary, and Approval Form (1B)
   b. Vertebrate Animal Form (5A)
   c. Qualified Scientist Form (2), when applicable
B. Additional Rules for Projects Conducted in a Regulated Research Institution

All studies not meeting the criteria in Section A that are otherwise permissible under Intel ISEF rules must be conducted in a Regulated Research Institution (RRI). A Regulated Research Institution within the U.S. 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 and may also be subject to U.S. Public Health Service Policy. 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 and research institutions that utilize research animals that are not covered by the Animal Welfare Act but have an operational Institutional Animal Care and Use Committee (IACUC) and are in compliance with U.S. federal laws are included in this definition. For projects conducted outside of the United States, a Regulated Research Institution would be a comparable research institution that adheres to country laws governing the care and use of vertebrate animals.

Some protocols permitted in a Regulated Research Institution are not permitted for participation in the Intel ISEF; adherence to RRI rules is necessary but may not be sufficient.

1. The Institutional Animal Care and Use Committee (IACUC) or the comparable animal oversight committee must approve all student research projects before experimentation begins. Such research projects must be conducted under the responsibility of a principal investigator. The local and affiliated fair SRCs must also review the project to certify that the research project complies with Intel ISEF Rules. This local and regional SRC review should occur before experimentation begins, if possible.

2. Student researchers are prohibited from performing euthanasia. Euthanasia at the end of experimentation for tissue removal and/or pathological analysis is permitted. All methods of euthanasia must adhere to current American Veterinarian Medical Association (AVMA) Guidelines.

3. Research projects that cause more than momentary or slight pain or distress to vertebrate animals that is not mitigated by approved anesthetics, analgesics and/or tranquilizers are prohibited.

4. Research in nutritional deficiency or research involving substances or drugs of unknown effect is permitted to the point that any clinical sign of distress is noted. In the case that distress is observed, the project must be suspended and measures must be taken to correct the deficiency or drug effect. A project can only be resumed if appropriate steps are taken to correct the causal factors.

5. The following forms are required:
   a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/Project Summary, and Approval Form (1B)
   b. Regulated Research Institution Form (1C)
   c. Qualified Scientist Form (2)
   d. Vertebrate Animal Form (5B)
   e. PHBA Risk Assessment Form (6A) – for all studies involving tissues and body fluids.
   f. Human and Vertebrate Animal Tissue Form (6B) – for all studies involving tissues and body fluids.

Sources of Information are available as a separate section at the end of the document.

Appendix I: USDA Pain Categories and Definitions for projects involving vertebrate animals:

<table>
<thead>
<tr>
<th>USDA Pain Categories &amp; Definition</th>
<th>NYCSEF Guidelines</th>
</tr>
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<tbody>
<tr>
<td><strong>Category A</strong>: Live animals will receive non-painful manipulation. Animals may be euthanized to obtain tissues, cells, etc.</td>
<td>Permitted only with proper training and certification</td>
</tr>
<tr>
<td><strong>Category B</strong>: 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.</td>
<td>Permitted only with proper training and certification</td>
</tr>
<tr>
<td><strong>Category C</strong>: 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. Euthanasia may not be performed by the student(s).</td>
<td>Permitted only with proper training and certification</td>
</tr>
<tr>
<td><strong>Category D</strong>: Live animals will have manipulations performed while anesthetized and are allowed to recover and/or animals will develop discernible 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.</td>
<td>PROHIBITED for entry into NYCSEF</td>
</tr>
<tr>
<td><strong>Category E</strong>: Live animals will experience significant / severe pain or distress, without benefit of anesthetics, tranquilizers, or analgesics.</td>
<td>PROHIBITED for entry into NYCSEF</td>
</tr>
</tbody>
</table>
Students are permitted to do research projects with potentially hazardous biological agents meeting the conditions and rules described below which were designed to protect students and to ensure adherence to federal and international biosafety regulations and guidelines.

When dealing with potentially hazardous biological agents, it is the responsibility of the student and all of the adults involved in a research project to conduct and document a risk assessment on Form (6A) to define the potential level of harm, injury or disease to plants, animals and humans that may occur when working with biological agents. The risk assessment determines a biosafety level which in turn determines if the project can proceed, and if so, the laboratory facilities, equipment, training, and supervision required.

All projects involving microorganisms, recombinant DNA technologies and human or animal fresh/frozen tissues, blood or body fluids must adhere to the rules below AND, depending on the study, to the additional rules in Section A, B or C.

**Rules for ALL Studies with Potentially Hazardous Biological Agents (PHBA)**

1. Prior review and approval is required for the use of potentially hazardous microorganisms (including bacteria, viruses, viroids, prions, rickettsia, fungi, and parasites), recombinant DNA (rDNA) technologies or human or animal fresh/frozen tissues, blood, or body fluids.

2. An affiliated fair SRC, an IBC or an IACUC must approve all research before experimentation begins. The initial risk assessment determined by the student researcher and adults supervising the project must be confirmed by the SRC, IBC or IACUC.

3. Experimentation involving the culturing of potentially hazardous biological agents, even BSL-1 organisms, is prohibited in a home environment. However, specimens maybe collected at home as long as they are immediately transported to a laboratory with the BSL containment determined by the affiliated fair SRC.

4. Research determined to be at Biosafety Level 1 (BSL-1) must be conducted in a BSL-1 or higher laboratory. The research must be supervised by a trained Designated Supervisor or a Qualified Scientist. The student must be properly trained in standard microbiological practices.

5. Research determined to be a Biosafety Level 2 (BSL-2) must be conducted in a laboratory rated BSL-2 or above (commonly limited to a Regulated Research Institution). The research must be reviewed and approved by the Institutional Biosafety Committee (IBC) if the Regulated Research Institution requires the review. For a high school BSL-2 laboratory, the SRC must review and approve. The research must be supervised by a Qualified Scientist.

6. Students are prohibited from designing or participating in BSL-3 or BSL-4 Research.

7. Laboratory studies designed to culture known clinically significant multidrug resistant organisms (MDROs) must have a written justification for usage and be conducted at a Regulated Research Institution laboratory with a minimum of BSL-2 containment and documented IBC review and approval. Representative examples include, but are not limited to the following known agents: MRSA (Methicillin-Resistant *Staphylococcus aureus*), VISA/VRSA (Vancomycin Intermediate or Resistant *Staphylococcus aureus*), VRE (Vancomycin-Resistant *Enterococci*), CRE (Carbapenem Resistant *Enterobacteriaceae*), ESBLs (Extended Spectrum Beta-Lactamase producing gram negative organisms), and fungi (yeasts or molds) with known resistance to antifungal agents.

8. Insertion of antibiotic resistance markers for the clonal selection of bioengineered organisms is permitted. However, students may not genetically engineer organisms with multiple drug resistant traits, nor intentionally select for such organisms through passage in culture, with the intended purpose of investigating the pathology, development, or treatment of antibiotic-resistant infections. Insertion of antibiotic-resistance traits or selection of organisms expressing traits that may affect the ability to provide effective treatment of infections acquired by humans, animals, or plants is strictly prohibited.

9. Extreme caution must be exercised when selecting and sub-culturing antibiotic-resistant organisms. Studies using such organisms, including BSL-1 organisms that may have originally been exempt from prior SRC approval, require at least BSL-2 containment.

10. The culturing of human or animal waste, including sewage sludge, is considered a BSL-2 study.

11. Naturally-occurring plant pathogens may be studied (not cultured) at home, but may not be introduced into a home/garden environment.

12. All potentially hazardous biological agents must be properly disposed at the end of experimentation in accordance with their biosafety level. For BSL 1 or BSL 2 organisms: Autoclave at 121 degrees Celsius for 20 minutes, use of a 10% bleach solution (1:10 dilution of domestic bleach), incineration, alkaline hydrolysis, biosafety pick-up and other manufacturer recommendations are acceptable.

13. Any proposed changes in the Research Plan/Project Summary by the student after initial local or affiliated fair SRC approval must undergo subsequent SRC or IBC review and approval before such changes are made and before experimentation resumes.

14. The following forms are required:
   a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/Project Summary, and Approval Form (1B)
   b. Regulated Research Institution Form (1C) - when applicable
   c. Qualified Scientist (2), when applicable
d. Risk Assessment (3), when applicable
e. PHBA Risk Assessment Form (6A), when applicable
f. Human and Vertebrate Animal Tissue Form (6B) – for all studies involving tissues and body fluids.

A. Additional Rules for Projects Involving Unknown Microorganisms

Studies involving unknown microorganisms present a challenge because the presence, concentration and pathogenicity of possible agents are unknown. In science fair projects, these studies typically involve the collection and culturing of microorganisms from the environment (e.g. soil, household surfaces, skin.)

1. Research with unknown microorganisms can be treated as a BSL-1 study under the following conditions:
   a. Organism is cultured in a plastic petri dish (or other standard sterile non-breakable container) and sealed.
   b. Experiment involves only procedures in which the petri dish remains sealed throughout the experiment (e.g., counting presence of organisms or colonies).
   c. The sealed petri dish is disposed of via autoclaving or disinfection under the supervision of the Designated Supervisor.

2. If a culture container with unknown microorganisms is opened for any purpose, (except for disinfection/disposal), it must be treated as a BSL-2 study and involve BSL-2 laboratory precautions.

B. Additional Rules for Projects Involving Recombinant DNA (rDNA) Technologies

Studies involving rDNA technologies in which microorganisms, plants and/or animals have been genetically modified require close review to assess the risk level assignment. Some rDNA studies can be safely conducted in a BSL-1 high school laboratory with prior review by a SRC.

1. All rDNA technology studies involving BSL-1 organisms and BSL-1 host vector systems, including commercially available kits, must be conducted in a BSL-1 laboratory under the supervision of a Qualified Scientist or Designated Supervisor and must be approved by the SRC prior to experimentation. Examples include cloning of DNA in E. coli K–12, S. cerevisiae, and B. subtilis host-vector systems.

2. An rDNA technology study using BSL-1 agents that may convert to BSL-2 agents during the course of experimentation must be conducted entirely in a BSL-2 facility.

3. All rDNA technology studies involving BSL-2 organisms and/or BSL-2 host vector systems must be conducted in a Regulated Research Institution and approved by the IBC prior to experimentation, where applicable.

4. Propagation of recombinants containing DNA coding for human, plant or animal toxins (including viruses) is prohibited.

5. All genome editing studies that include alteration of germline cells, insertion of gene drives, use of rapid trait development systems (RTDS*), etc., should be categorized as a BSL-2 study and must be conducted at an RRI and approved by the IBC from the institution. Qualified scientists are expected to ensure that student research protocols address appropriate intrinsic and extrinsic containment precautions.

6. Introduction or disposal of non-native, genetically-altered, and/or invasive species (e.g. insects or other invertebrates, plants, vertebrates), pathogens, toxic chemicals or foreign substances into the environment is prohibited. Students and adult sponsors should reference their local, state and national regulations and quarantine lists.

C. Additional Rules for Projects with Tissues and Body Fluids, including Blood and Blood Products

Studies involving fresh/frozen tissue, blood or body fluids obtained from humans and/or vertebrates may contain microorganisms and have the potential of causing disease. Therefore, a proper risk assessment is required.

1. Research involving human and/or non-human primate established cell lines and tissue culture collections (e.g., obtained from the American Type Culture Collection) must be considered a BSL-1 or BSL-2 level organism as indicated by source information and treated accordingly. The source and/or catalog number of the cultures must be identified in the Research Plan/Project Summary.

2. If tissues are obtained from an animal that was euthanized for a purpose other than the student’s project, it may be considered a tissue study.
   a. Use of tissues obtained from research conducted at a Regulated Research Institution requires 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.
   b. Use of tissues obtained from agricultural/aquacultural studies require prior SRC approval.

3. If the animal was euthanized solely for the student’s project, the study must be considered a vertebrate animal project and is subject to the vertebrate animal rules. (See vertebrate animal rules.)

4. The collection and examination of fresh/frozen tissue and/or body fluids, (not including blood or blood products; see rule 8) from a non-infectious source with little likelihood of microorganisms present must be considered Biosafety level 1 studies and must be conducted in a BSL-1 laboratory or higher and must be supervised by a Qualified Scientist or trained Designated Supervisor.

5. The collection and examination of fresh/frozen tissues or body fluids or meat and meat by-products NOT obtained from food stores, restaurants, or packing houses may contain microorganisms. Because of the increased risk from unknown potentially hazardous agents, these studies must be considered biosafety level 2 studies conducted in a BSL-2 laboratory under the supervision of a Qualified Scientist.

6. Human breast milk of unknown origin, unless certified free of HIV and Hepatitis C, and domestic unpasteurized animal milk are considered BSL-2.

7. All studies involving human or wild animal blood or blood products should be considered at a minimum a Biosafety level 2 study and must be conducted in a BSL-2 laboratory under the supervision of a Qualified Scientist. Known BSL-3 or BSL-4 blood is prohibited. Studies involving domestic animal blood may be considered a BSL-1 level study. All blood must be handled in accordance with standards and regulations.
guidelines set forth in the OSHA, 29CFR, Subpart Z. Any tissue or instruments with the potential of containing blood-borne pathogens (e.g. blood, blood products, tissues that release blood when compressed, blood contaminated instruments) must be properly disposed after experimentation.

8. Studies of human body fluids, where the sample can be identified with a specific person, must have IRB review and approval, and informed consent.

9. Any study involving the collection and examination of body fluids that may contain biological agents belonging to BSL-3 or BSL-4 is prohibited.

10. A project involving a student researcher using their own body fluids (if not cultured)
   a. can be considered a BSL-1 study
   b. may be conducted in a home setting
   c. must have IRB review if the body fluid is serving as a measure of an effect of an experimental procedure on the student researcher (e.g. Student manipulates diet and takes a blood or urine sample). An example of a project not needing IRB review would be collecting urine to serve as a deer repellent.
   d. must receive prior SRC review and approval prior to experimentation.

11. Studies involving embryonic human stem cells must be conducted in a Registered Research Institution and reviewed and approved by the ESCRO (Embryonic Stem Cell Research Oversight) Committee.

Exempt Studies (no SRC pre-approval required)

The following types of studies are exempt from prior SRC review as listed below, but may be subject to additional rules dependent upon the design of the project. Student researchers and adult sponsors are required to refer to sections A, B, and C of this section to review additional rules for projects that involve unknown organisms, recombinant DNA (rDNA) technologies, tissues, fluids, blood, or blood products before deciding upon a final biosafety level (BSL) designation for projects.

1. The following types of studies are exempt from prior SRC review, but require a Risk Assessment Form 3:
   a. Studies involving protists and archaea.
   b. Research using manure for composting, fuel production, or other non-culturing experiments.
   c. Commercially-available color change coliform water test kits. These kits must remain sealed and must be properly disposed.
   d. Studies involving decomposition of vertebrate organisms (such as in forensic projects).
   e. Studies with microbial fuel cells.

2. The following types of studies involve BSL-1 organisms and are exempt from prior SRC review and require no additional forms:
   a. Studies involving baker’s yeast and brewer’s yeast, except in rDNA studies.
   b. Studies involving Lactobacillus, Bacillus thuringiensis, nitrogen-fixing, oil-eating, and algae-eating bacteria introduced into their natural environment. (Not exempt if cultured in a petri dish environment.)
   c. Studies involving water or soil microbes not concentrated in media conducive to their microbial growth
   d. Studies of mold growth on food items if the experiment is terminated at the first evidence of mold.
   e. Studies of slime molds and edible mushrooms.
   f. Studies involving E. coli k-12 (and other strains of E. coli used solely as a food source for C. elegans) that are performed at school and are not subject to additional rules for recombinant DNA studies or use of antibiotic resistant organisms.

Sources of Information are available as a separate section at the end of the document.
Risk assessment defines the potential level of harm, injury or disease to plants, animals and humans that may occur when working with biological agents. The end result of a risk assessment is the assignment of a biosafety level which then determines the laboratory facilities, equipment, training, and supervision required. Risk assessment involves:

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

**Classification of Biological Agents Risk Groups**

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

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

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

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

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

**Levels of Biological Containment**

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

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

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

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

**BSL-4**
- containment is required for dangerous/exotic agents that pose high risk of life-threatening disease. Projects in the BSL-4 group are prohibited.
Hazardous Chemicals, Activities or Devices Rules
Includes DEA-controlled substances, prescription drugs, alcohol & tobacco, firearms and explosives, radiation, lasers, etc.

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

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

Rules for ALL Projects Involving Hazardous Chemicals, Activities and Devices

1. All projects involving hazardous chemicals, activities or devices must describe in the research plan the risk assessment process, supervision, safety precautions and methods of disposal.

2. The use of hazardous chemicals and devices and involvement in hazardous activities require direct supervision by a Designated Supervisor, except those involving DEA-controlled substances, which require supervision by a Qualified Scientist.

3. The student researcher must conduct a risk assessment in collaboration with a Designated Supervisor or Qualified Scientist prior to experimentation. This risk assessment is documented on the Risk Assessment Form 3.

4. Student researchers must acquire and use regulated substances in accordance with all local, state, U.S. federal and country laws. For further information or classification for these laws and regulations, contact the appropriate regulatory agencies.

5. For all chemicals, devices or activities requiring a Federal and/or State Permit, the student/supervisor must obtain the permit prior to the onset of experimentation. A copy of the permit must be available for review by adults supervising the project and the local, affiliated, and Intel ISEF SRCs in their review prior to competition.

6. The student researcher must minimize the impact of an experiment on the environment. Examples include using minimal quantities of chemicals that will require subsequent disposal; ensuring that all disposal is done in an environmentally safe manner and in accordance with good laboratory practices.

7. The following forms are required:
   a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/Project Summary and Approval Form (1B)
   b. Regulated Research Institution Form (1C), when applicable
   c. Qualified Scientist Form (2), when applicable
   d. Risk Assessment Form (3)

Additional Rules for Specific Regulated Areas
There are additional rules for the following regulated areas:

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

1. All studies using DEA-controlled substances must be supervised by a Qualified Scientist who is licensed by the DEA (or other international regulatory body) for use of the controlled substance.

2. All studies using DEA Schedule 1 substances (including marijuana) must have the research protocol approved by DEA before research begins. Schedule 2, 3 and 4 substances do not require protocol approval by DEA.

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

1. Students are prohibited from administering prescription drugs to human participants.

2. A veterinarian must supervise student administration of any prescription drugs to vertebrate animals.

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

1. Fermentation studies in which minute quantities of ethyl alcohol are produced are permitted.

2. The Designated Supervisor is responsible for the acquisition, usage and appropriate disposal of the alcohol or tobacco used in the study.

3. Production of wine or beer by adults is allowable in the home and must meet TTB home production regulations. Students are allowed to design and conduct a research project, under direct parental supervision, involving the legal production of the wine or beer.

4. Students are prohibited from conducting experiments where consumable ethyl alcohol is produced by distillation. However, students are allowed to distill...
alcohol for fuel or other non-consumable products. To do so, the work must be conducted at school or a Regulated Research Institution and follow all local and country laws. See Alcohol and Tobacco Tax and Trade Bureau (TTB) website for details.

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

The purchase of a firearm by a minor is generally unlawful. The use of a firearm, without proper state certification, is illegal. Students should check the training and certification requirements of individual states and countries.
1. Projects involving firearms and explosives are allowable when conducted with the direct supervision of a Designated Supervisor and when in compliance with all federal, state and local laws.
2. A fully assembled rocket motor, reload kit or propellant modules containing more than 62.5 grams of propellant are subject to the permitting, storage and other requirements of federal explosive laws and regulations.
3. Potato guns and paintball guns are not considered firearms unless they are intended to be used as weapons. However, they must be treated as hazardous devices.

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

F. Radiation
Projects involving radionuclides (radioisotopes) and X-rays must involve a careful examination of the risks associated with the study and appropriate safety precautions must be taken. Depending upon the level of exposure, radiation released from these sources can be a health hazard.
1. All studies may not exceed the dose limits set by the Nuclear Regulatory Commission of 0.5 mrem/hr or 100 mrem/year of exposure.
2. If the voltage needed in the study is <10 kvolts, a risk assessment must be conducted. The study may be done at home or school, and SRC preapproval is not required.
3. A study using 10-25 kvolts must have a risk assessment conducted and must be preapproved by the SRC to assess safety. Such a study must be conducted in a metal chamber using a camera only, not direct view through glass. A dosimeter or radiation survey meter is required to measure radiation exposure.
4. All studies using > 25 kvolts must be conducted at an institution with a Licensed Radiation Program and must be preapproved by the Institutions’ Radiation Safety Officer or the Committee which oversees the use of ionizing radiation to ensure compliance with state and federal regulations.
Guidance for Risk Assessment
Please find below guidance on conducting risk assessment when using the following:
• Hazardous Chemicals
• Hazardous Devices
• Radiation

1. Hazardous Chemicals
A proper risk assessment of chemicals must include review of the following factors:

a. Toxicity – the tendency of a chemical to be hazardous to health when inhaled, swallowed, injected or in contact with the skin.

b. Reactivity - the tendency of a chemical to undergo chemical change.

c. Flammability - the tendency of a chemical to give off vapors which readily ignite when used under normal working conditions.

d. Corrosiveness - the tendency of a chemical, upon physical contact, to harm or destroy living tissues or physical equipment.

When assessing risk, the type and amount of exposure to a chemical must be considered. For example, an individual’s allergic and genetic disposition may have an influence on the overall effect of the chemical. The student researcher must refer to Safety Data Sheets provided by the vendor (SDS) to ensure that proper safety precautions are taken. Some SDS sheets (e.g., Flinn) rank the degree of hazard associated with a chemical. This rating may assist students and adult sponsors in determining risk associated with the use of a chemical.

A risk assessment (documented on Form 3) must include proper disposal methods for the chemicals used in an experiment. The Flinn Catalog (referenced in the Sources of Information section) provides information for the proper disposal of chemicals. If applicable, the student researcher must incorporate in the research plan disposal procedure required by federal and state guidelines.

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

3. Radiation
A risk assessment (documented on Form 3) must be conducted when a student’s project involves radiation beyond that normally encountered in everyday life. Non-ionizing radiation includes the spectrum of ultraviolet (UV), visible light, infrared (IR), microwave (NW), radiofrequency (RF) and extremely low frequency (ELF).
Engineering Projects Guide

Use this information to help determine the requirements of Engineering Projects and potential areas that will require pre-approval and/or extra safety precautions.

Engineering Project Checklist

Consider the answers to the questions below. If the response is yes, then the project may fall under more specific rules and those sections of the International Rules & Guidelines should be consulted.

Hazardous Chemicals, Activities and Devices

Will your project involve any of the following:

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

Vertebrate Animals

- Does your project include any interaction with vertebrate animals in any phase of the project?

Potentially Hazardous Biological Agents

- Does your project include any collection, examination or handling of microorganisms, and/or fresh or frozen tissue, primary cell cultures, blood, blood products or body fluids?
- Are you going to culture or isolate any substance, known or unknown?

Human Participants

- Do you intend to gather background knowledge through a survey or interviews to understand the potential use and needs for your project design?
- Are you going to ask for opinions or suggestions on your project design at any point of the project?
- Are you going to test your project (device, app, invention, prototype, etc.)? If yes, does it require persons to interact with it other than yourself?
- Does your project intend to gather personal data/have a health benefit to the user?
Sources of Information for All Projects

1. United States Patent and Trade Office
   Customer Service: 1-800-786-9199 (toll-free); 571-272-1000 (local); 571-272-9950 (TTY).
   www.uspto.gov
   www.uspto.gov/patents/process/index.jsp

2. European Patent Office
   www.epo.org
   www.epo.org/applying/basics.html

3. The Mad Scientist Network at Washington University School of Medicine:
   www.madsci.org

4. ANS Task Force
   www.anstaskforce.gov
   Aquatic Nuisance Species (ANS) Task Force
   www.anstaskforce.gov
   www.anstaskforce.gov/Documents/ISEF.pdf

5. APHIS
   www.aphis.usda.gov/
   Animal and Plant Health Inspection Service
   Invasive Species List

6. Invasive Species Specialist Group
   www.issg.org
   The Global Invasive Species database contains invasive species information supplied by experts from around the world.

7. Invasive Species Information
   www.invasivespeciesinfo.gov/resources/lists.shtml
   Provides information for species declared invasive, noxious, prohibited, or harmful or potentially harmful.

   http://www.successwithscience.org
   ISBN 0-9633504-8-X

Human Participants


   Can be purchased from:
   www.amazon.com

3. NIH tutorial, “Protecting Human Research Participants”.
   http://phrp.nihtraining.com/files/PHRP.pdf

   www.hhs.gov/ohrp/humansubjects/guidance/belmont.html

   www.apa.org/science/programs/testing/standards.aspx

6. American Psychological Association
   750 First Street, NE Washington, DC 20002-4242
   phone: 202-336-5500; 800-374-2721
   www.apa.org
   Information for students:
   www.apa.org/science/leadership/students/information.aspx
   Information regarding publications:

7. Educational and Psychological Testing
   Testing Office for the APA Science Directorate
   phone: 202-336-6000
   email: testing@apa.org

8. The Children’s Online Privacy Protection Act of 1998 (COPPA)
   www.ftc.gov/privacy/coppa.png

Vertebrate Animals

Animal Care and Use

1. Laboratory Animals, Institute of Laboratory Animal Research (ILAR), Commission on Life Sciences, National Research.
   http://dels.nas.edu/ilar

   www.nap.edu/catalog.php?record_id=12910

3. Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research (2003), Institute for Laboratory Animal Research (ILAR).
   To order these ILAR publications contact:
   National Academies Press
   500 Fifth Street, NW
   Washington, DC 20055
   phone: 888-624-8373 or 202-334-3313; fax: 202-334-2451
   www.nap.edu

4. Federal Animal Welfare Act (AWA)
   7 U.S.C. 2131-2157
   Subchapter A - Animal Welfare (Parts I, II, III)
   Document is available from:
   USDA/APHIS/AC
   4700 River Road, Unit 84
   Riverdale, MD 20737-1234
   email: ace@aphis.usda.gov
   phone: 301-734-8373 or 202-334-3313; fax: 301-734-4978
   http://awic.nal.usda.gov

5. Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (Agri-Guide)
   Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International)
   https://www.aaalac.org/
   https://www.aaalac.org/about/Ag_Guide_3rd_ed.pdf
   www.fisheries.org

7. **Euthanasia Guidelines**
   AVMA Guidelines on Euthanasia (2013)
   American Veterinary Medical Association
   www.avma.org/KB/Policies/Documents/euthanasia.pdf

**Alternative Research and Animal Welfare**

1. The National Library of Medicine provides computer searches through MEDLINE:
   Reference & Customer Services
   National Library of Medicine
   8600 Rockville Pike
   Bethesda, MD 20894
   888-FIND-NLM or 888-346-3656; 301-594-5983;
   email: info@ncbi.nlm.nih.gov
   www.nlm.nih.gov

   Animal Welfare Information Center
   National Agriculture Library
   10301 Baltimore Avenue, Room 410
   Beltsville, MD 20705-2351
   phone: 301-504-6212, fax: 301-504-7125
   email: awic@ars.usda.gov
   www.nal.usda.gov/awic

3. Institute of Laboratory Animal Resources (ILAR) provides a variety of information on animal sources, housing and handling standards, and alternatives to animal use through annotated bibliographies published quarterly in ILAR Journal.
   ILAR - The Keck Center of the National Academies
   500 Fifth Street, NW, Keck 687
   Washington, DC 20001
   phone: 202-334-2590, fax: 202-334-1687
   email: ILAR@nas.edu
   http://dels.nas.edu/ilar

4. Quarterly bibliographies of Alternatives to the Use of Live Vertebrates in Biomedical Research and Testing may be obtained from:
   Specialized Information Services
   NLM/NIH
   2 Democracy Plaza, Suite 510
   6707 Democracy Blvd., MSC 5467
   Bethesda, MD 20892-5467
   phone: 301-496-1131; Fax: 301-480-3537
   email: tehip@teh.nlm.nih.gov

5. Johns Hopkins Center for Alternatives to Animal Testing (CAAT) has worked with scientists since 1981 to find new methods to replace the use of laboratory animals in experiments, reduce the number of animals tested, and refine necessary tests to eliminate pain and distress.
   email: caat@jhsph.edu
   http://caat.jhsph.edu/

6. Quality Assurance Manuals (for appropriate species)
   Such as:
   Poultry: https://www.bordbia.ie/industry/farmers/quality/
PoultrySchemeStandards/Poultry%20Producer.pdf
   Beef: https://www.bqa.org/Media/BQA/Docs/nationalmanual.pdf
   Pork: http://www.pork.org/

**Potentially Hazardous Biological Agents**

1. American Biological Safety Association: ABSA Risk Group Classification – list of organisms
   www.absa.org

2. American Type Culture Collection (ATCC)
   www.atcc.org

3. Bergey’s Manual of Systematic Bacteriology website – follow the links for resources and microbial databases for a collection of international websites of microorganisms and cell cultures.
   www.bergeys.org/resources.html

4. Biosafety in Microbiological and Biomedical Laboratories (BMBL) - 4th Edition. Published by CDC-NIH.
   www.cdc.gov/biosafety/publications/bmbl5/BMBL.pdf

5. World Health Organization Laboratory Safety Manual
   www.who.int/diagnostics_laboratory/guidance/en

6. Canada – Agency of Public Health – list of non-pathogenic organisms
   https://www.canada.ca/en/public-health/services/laboratory-
biosafety-biosecurity/pathogen-safety-data-sheets-risk-
assessment.html

7. American Society for Microbiology
   https://www.asm.org/division/w/web-sites.htm

8. Microbiology Society
   Charles Darwin House
   12 Roger Street
   London
   WC1N 2JU
   UK
   education@microbiologyociety.org
   http://microbiologyonline.org

9. NIH Guidelines for Research Involving Recombinant DNA Molecules. Published by National Institutes of Health.
   https://osp.od.nih.gov/wp-content/uploads/2013/06/NIH-
Guidelines.pdf

10. OSHA – Occupational Health and Safety Administration
    www.osha.gov

**Hazardous Chemicals, Activities or Devices**

**General Lab/Chemical Safety**

   Order from (first copy free of charge):
   American Chemical Society
   Publications Support Services
   1155 16th Street, NW
   Washington, DC 20036
   phone: 202- 872-4000 or 800-227-5558
   email: help@acs.org
   www.acs.org/education
2. General
Howard Hughes Medical Institute has resources for working with cell cultures, radioactive materials and other laboratory materials.
http://www.hhmi.org/developing-scientists/resources

3. Environmental Protection Agency (EPA) website for green chemistry
www.epa.gov/greenchemistry

4. Safety Data Sheets (SDS)
www.flinnci.com/msds-search.aspx
A directory of SDS sheets from Flinn Scientific Inc. that includes a ranking of hazard level and disposal methods.

www.ilpi.com/msds/index.html - A listing of numerous sites that have free downloads of MSDS sheets.

5. Pesticides
National Pesticide Information Center
http://npic.orst.edu/ingred/products.html
Describes the various types of pesticides and the legal requirements for labelling. Provides links and phone numbers to get additional information.

Environmental Protection Agency
http://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1
A database of product labels. Enter the product name or company name to view the approved label information of pesticides which are registered with the agency.

6. DEA Controlled Substances
Drug Enforcement Agency website:
www.justice.gov/dea/index.htm
Controlled Substance Schedules- a list of controlled substances:
www.deadiversion.usdoj.gov/schedules/

7. Alcohol, Tobacco, Firearms, and Explosives
Alcohol and Tobacco Tax and Trade Bureau
www.ttb.gov
Bureau of Alcohol, Tobacco, Firearms and Explosives
www.atf.gov

8. Radiation
Radiation Studies Information (CDC)
www.cdc.gov/nceh/radiation/default.htm

9. CDC Laboratory Safety Manuals
www.cdc.gov/biosafety/publications/index.htm

10. Occupational Safety and Health Administration
www.osha.gov
Safety and Health Topics:
www.osha.gov/SLTC
www.osha.gov/SLTC/reactivechemicals/index.html
www.osha.gov/SLTC/laserhazards/index.html
www.osha.gov/SLTC/radiationionizing/index.html

11. U.S. Nuclear Regulatory Commission
Material Safety and Inspection Branch
One White Flint North
11555 Rockville Pike
Rockville, MD 20852
phone: 301-415-8200; 800-368-5642
www.nrc.gov
The following Display Rules and Guidelines are to be used for presenting at the New York City Science and Engineering Fair (NYCSEF) and are intended for the safety of students presenting at all NYCSEF events.

Note: Some regulations differ from those listed by the Intel ISEF Display and Safety Guidelines.

General Requirements
NYCSEF staff is the final authority on display and safety issues for projects entered in all NYCSEF events. Occasionally, NYCSEF staff may require students to make revisions to their displays to conform to the rules and guidelines specified below. Decisions made by the NYCSEF Scientific Review Committee and NYCSEF staff are final.

Maximum Size of Project
It is recommended that students prepare a three panel presentation board (see diagram below) that can be set up without additional supports on top of a table. Students choosing to prepare their project board as a single printed sheet must also supply their own support mechanism (i.e. a blank three-panel presentation board). There will be no easels or other display stands available at the NYCSEF events.

Display Dimensions
15 inches (38 centimeters) deep front to back
30 inches (76 centimeters) side to side
60 inches (152 centimeters) table top to top of poster display

At NYCSEF, students will be required to set up their poster presentations on top of tables provided in a designated area. Typically four projects are assigned to share space on a five foot rectangular table. Maximum display sizes include all project materials and supports and should adhere to these dimensions after final set-up. If a title board (header board) is used, it becomes part of the overall display board and therefore, must not exceed the allowed dimensions.

Any project component used by the student for demonstration purposes must be done within the confines of the space provided at the event – this includes any demonstration apparatus or object (e.g. model, laptop, computer screen, etc). When not being used, all demonstration materials must be removed as to not interfere with presentations made by neighboring students.

Not Allowed at Project Display
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 (i.e. blood, urine, etc).
6. Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non-manufactured state (exception: manufactured construction materials used in building the project or display).
7. All chemicals including water (exceptions: water integral to an enclosed apparatus or water supplied for consumption).
8. All hazardous substances or devices (i.e. poisons, drugs, firearms, weapons, ammunition, reloading devices, and lasers - including laser pointers).
9. Dry ice or other sublimating solids.
10. Sharp items (i.e. syringes, needles, pipettes, knives, etc.).
11. Flames or highly flammable materials.
12. Batteries with open-top cells or wet cells.
13. Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissections, necropsies, or other lab procedures.
14. Easels
15. Active internet or email connections as part of displaying or operating the project.

16. Prior years’ written material or visual depictions on the display board. Prior years’ data books—not research papers—can be present but only as a reference and must not be part of the display.

17. Glass or glass objects (exception: glass that is an integral part of a commercial product such as a computer screen).

18. Any apparatus deemed unsafe by the NYCSEF Scientific Review Committee or NYCSEF event staff.

19. Postal addresses, business cards, World Wide Web, e-mail, and/or social media addresses, or codes, telephone, and/or fax numbers of a competing participant.

20. Drones or any flight-capable apparatus unless the propulsion power source is removed.

21. 3D Printers unless the power source is removed.

22. Inadequately insulated apparatus (as determined by the NYCSEF Scientific Review Committee or NYCSEF event staff) capable of producing dangerous temperatures are not permitted.

23. Any apparatus with belts, pulleys, chains, or moving parts with tension or pinch points that are not appropriately shielded.

Allowed at Project Display with Restrictions Indicated

1. Soil, rocks, and/or waste samples if permanently encased in a slab of acrylic.

2. Photographs and/or visual depictions if:
   a. They are not deemed offensive or inappropriate by NYCSEF staff. This includes, but is not limited to visually offensive photographs or visual depictions of invertebrate or vertebrate animals.
   b. They have credit lines of origin (“Photograph taken by...” or “Image taken from...”).
   c. They are from the internet, magazines, newspapers, journals, etc., and credit lines are attached.
   d. They are photographs or visual depictions of the competing participant(s).
   e. They are photographs of human subjects for which signed consent forms are with the project display. (Human Subject Form 4 or equivalent must include photograph release consent signed by the subject.)

3. Any apparatus with unshielded belts, pulleys, chains, or moving parts with tension or pinch points if for display only and not operated.

4. Class III and IV lasers if for display only and NOT operated.

5. Any apparatus producing temperatures that will cause physical burns must be adequately insulated.

Electrical Regulations at NYCSEF

1. Students requesting access to electric outlets must indicate this request on the NYCSEF online application form. NYCSEF cannot guarantee access to electric outlets on the day of competition without this request.

2. Students requiring access to electric outlets must supply their own UL-Listed 3-wire extension cord which is appropriate for the load and equipment.

3. Electrical power that will be supplied at the NYCSEF event is 120 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 NYCSEF or event staff. For all electrical regulations, “120 Volt A.C.” is intended to encompass the corresponding range of voltage as supplied by the facility in which the NYCSEF events are being held.

4. All electrical connectors, wiring, switches, extension cords, fuses, etc. must be UL-listed and must be appropriate for the load and equipment.

5. Wiring 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 Volt power source.

7. Any lighting or wiring that generates considerable and excessive amounts of heat (high-intensity lamps, certain halogen lights, etc) will not be permitted in the exhibit hall. Students may be asked to remove
such lighting if deemed excessive by NYCSEF or event staff at the competition.

8. No exposed live circuits over 36 volts are allowed.

Other NYCSEF Information and Requirements

1. Students must be physically present at their projects in the exhibit hall during the designated judging times. Failure to do so may result in the project not being judged.

2. All students MUST register and set up their project displays in person for each level of competition – this includes all members of a Team Project. Students needing special consideration or accommodations must request so, in writing, to NYCSEF staff PRIOR to the event dates. All decisions will be made on a case by case basis.

3. NYCSEF staff reserve the right to remove any project for safety reasons or to protect the integrity of the NYCSEF events and its rules and regulations. NYCSEF staff will remove the project in the safest manner possible but is not responsible for damage to the project.

4. A project data book, lab notebook, and/or research paper are not required to be displayed at the NYCSEF events; however, they may be helpful for judges. A student research paper is required for submission with the NYCSEF application.

5. Students will NOT be allowed to distribute any CDs, printed materials, pamphlets, etc. (EXCEPT abstracts) to judges or the public during the NYCSEF events. No copies will be made for students on the day of the events. Any materials for distribution will be confiscated and discarded by NYCSEF staff.

6. Project sounds, lights, odors, or any other display items must not be distracting.

7. No food or drinks, except small containers of bottled water for personal consumption, are allowed in the Exhibit Hall.

8. Students are responsible for the removal of their project boards and any other display material used during the NYCSEF events. Failure to do so will result in these materials being discarded at the conclusion of the day’s event.

9. NYCSEF, The New York City Department of Education and the City University of New York are not responsible for any loss or damage to project displays or materials.

Display Suggestions

Students preparing their poster displays and presentations should consider the following:

- Poster displays should attract and inform – but NOT distract.
- Make it easy for interested spectators and judges to assess the study and the results obtained.
- Make the most of the available space using clear and concise language and visuals.
- The title is an extremely important attention grabber and should simply and accurately present the research and depict the nature of the project.
- Make sure the display follows a sequence and is logically presented and easy to read.
- Use neat, colorful headings, charts and graphs to present your project. Pay special attention to the labeling of graphs, charts, diagrams and tables.
- Be sure to adhere to the size limitations and safety rules described above when preparing the poster display.

Keep in mind - the judges are judging the research project, not the display. However, as a visual summary of the research, the display should be neat and describe the major work of the project without significant verbal explanation.
The following categories are to be used for the 2019 New York City Science and Engineering Fair. In some cases, categories and subcategories have been combined for the purposes of the NYCSEF events and differ from those used in the Intel ISEF; a full description of the Intel ISEF categories can be found on the ISEF website.

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANIMAL SCIENCES</strong></td>
<td>Development, Ecology, Animal Husbandry, Pathology, Physiology, Population Genetics, Systematics, Other</td>
</tr>
<tr>
<td><strong>BEHAVIORAL - Sociology/Psychology</strong></td>
<td>Social Psychology, Clinical &amp; Developmental Psychology, Other</td>
</tr>
<tr>
<td><strong>BEHAVIORAL - NEUROSCIENCE</strong></td>
<td>Cognitive Neuroscience, Physiological Psychology, Other</td>
</tr>
<tr>
<td><strong>BIOCHEMISTRY</strong></td>
<td>General Biochemistry, Metabolism, Structural Biochemistry, Other</td>
</tr>
<tr>
<td><strong>CELLULAR &amp; MOLECULAR BIOLOGY</strong></td>
<td>Cellular Biology, Cellular &amp; Molecular Genetics, Immunology, Molecular Biology, Other</td>
</tr>
<tr>
<td><strong>CHEMISTRY</strong></td>
<td>Analytic Chemistry, Analytical Chemistry, General Chemistry, Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Other</td>
</tr>
<tr>
<td><strong>ENGINEERING</strong></td>
<td>Aerospace &amp; Aeronautical Engineering, Bioengineering, Civil &amp; Chemical Engineering, Computer Engineering, Computer &amp; Electrical Engineering, Controls, Energy &amp; Transportation, Industrial Engineering, Mechanical Engineering, Material Science, Robotics, Other</td>
</tr>
<tr>
<td><strong>MEDICINE &amp; HEALTH SCIENCES</strong></td>
<td>Disease Diagnosis &amp; Treatment, Epidemiology, Genetics, Molecular Biology of Diseases, Physiology &amp; Pathophysiology, Other</td>
</tr>
<tr>
<td><strong>MICROBIOLOGY</strong></td>
<td>Antibiotics, Antimicrobials, Bacteriology, Microbial Genetics, Virology, Other</td>
</tr>
<tr>
<td><strong>PHYSICS &amp; SPACE</strong></td>
<td>Atoms, Molecules, Solids, Astronomy, Biological Physics, Geophysics, Instrumentation &amp; Electronics, Magnetics and Electromagnetics, Nuclear &amp; Particle Physics, Optics, Lasers, Masers, Planetary Science, Theoretical Physics, Theoretical or Computational Astronomy, Other</td>
</tr>
<tr>
<td><strong>PLANT SCIENCES</strong></td>
<td>Agriculture/Agronomy, Development, Ecology, Photosynthesis, Plant Genetics, Plant Physiology, Plant Systematics, Evolution, Other</td>
</tr>
</tbody>
</table>
### Project Title: 


### Category: 


### Student Name(s) and School: 

#### NOTE: In order to successfully apply for NYCSEF 2019, students must submit:

1. ONE (1) printout of the 3 part NYCSEF online application confirmation emails
2. ONE (1) set of the signed NYCSEF required and supplemental forms (where applicable)
3. TWO (2) copies of the research paper

**All MUST be POSTMARKED by December 12, 2018**

Only students who follow the proper rules and guidelines and submit ALL necessary materials will be eligible to have their application reviewed by the NYCSEF Scientific Review Committee and be considered for competition in any of the NYCSEF events.

### Acknowledgement of Participation:

#### a. Student and Parent/Guardian Acknowledgement:

We certify that we are aware of and adhere to all the rules to participate in the New York City Science and Engineering Fair (NYCSEF) as stated in the NYCSEF Rules and Guidelines. I (We) understand all of the risks and dangers that may be inherent in conducting research; that this project complies with all the regulations as described in the rules and guidelines, including safety and size limitations; and that failure to comply with these guidelines may result in the failure to qualify for competition. I (We) certify that the enclosed application is complete and that ALL requested information has been submitted to the best of my (our) knowledge. I (We) further certify that this project is the work of the applicant(s); that all projects will be set up and removed only during specified hours at exhibit sites; and exhibited with parental consent. We understand that images and/or photographs may be taken during the event and give permission for CUNY to use them for non-commercial purposes for the promotion of NYCSEF. I (We) understand that I (we) may be selected to attend the International Science and Engineering Fair and represent NYC in Phoenix, AZ from May 12-17, 2019. I (We) understand that the New York City Department of Education and the City University of New York are not responsible for any loss or damage to projects or project displays.

<table>
<thead>
<tr>
<th>Student #1 Name</th>
<th>Signature</th>
<th>Date</th>
<th>Parent/Guardian Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student #2 Name</td>
<td>Signature</td>
<td>Date</td>
<td>Parent/Guardian Name</td>
<td>Signature</td>
<td>Date</td>
</tr>
<tr>
<td>Student #3 Name</td>
<td>Signature</td>
<td>Date</td>
<td>Parent/Guardian Name</td>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

#### b. Science/Research Teacher Approval:

I have read and reviewed all the material submitted for this research project application. I agree to sponsor the student(s) named above and assume reasonable responsibility for compliance with all New York City Science and Engineering Fair rules and guidelines as they pertain to this application and that failure to comply may result in disqualification of the student(s).

<table>
<thead>
<tr>
<th>Printed Name (Title)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>

#### c. Principal Approval:

I agree to support the student(s) named above for entry to the New York City Science and Engineering Fair and to have these student(s) represent my school at all levels of this competition.

<table>
<thead>
<tr>
<th>Printed Name (Title)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>
2019 New York City Science and Engineering Fair
STUDENT / PROJECT INFORMATION – PRINT clearly.

Project Title: ________________________________________________________________

Student #1 (Team Leader) Information:

OSIS (required for NYC public HS students only): ________________________________

First Name: ____________________________ M.I. __________ Last Name: ____________________________

Address: ___________________________________________ Apt#: ________________

City: ____________________________ State: _______ Zip: ________ Home Phone: (____) ______________________

E-mail: _________________________________________ Cell Phone: (____) ______________________

Date of Birth (mm/dd/yy): ____/____/______ Sex: ______ M ______ F ______ Current Grade: _________

Race/Ethnicity: (for statistical purposes only - optional)

Are you Hispanic/Latino? ____ Yes ____ No

Select one or more races:

____ Black or African American ___ Asian ___ White

___ Native Hawaiian or Pacific Islander ___ American Indian or Alaska Native

School Information

School Name: _________________________________ ETS Code: ______________________

School Address: __________________________________ City: ______________ Zip: __________

Sponsoring Science/Research Teacher: ___________________________ Email: ______________________

Principal Name: _______________________________ Email: ______________________

Project Category: (select one) see page 3 for more descriptions.

___ Animal Sciences ___ Chemistry ___ Medicine & Health Sciences

___ Behavioral-Neuroscience ___ Computational Science ___ Microbiology

___ Behavioral-Sociology/Psychology ___ Earth & Environmental Sciences ___ Physics & Space

___ Biochemistry ___ Engineering ___ Plant Sciences

___ Cellular & Molecular Biology ___

Type of Project? *Team Individual

*(If team, you must fill out all team members’ student information on the Team Information Form)

If this is a Team Project, are you the Team Leader? ____ Yes ____ No

Will you need electricity for your display? Yes No
2019 New York City Science and Engineering Fair
TEAM INFORMATION

Student # 2 (Team Member) Information:

OSIS (required for NYC public HS students only): ____________________________

First Name: ___________________________ M.I. _____ Last Name: _________________________

Address: ___________________________________________________________ Apt#: __________

City: ___________________________ State: _______ Zip: __________ Home Phone: (____) __________________

E-mail: _______________________________________________ Cell Phone: (____) __________________

Date of Birth (mm/dd/yy): _____/____/____ Sex: M____ F____ Current Grade: 9th 10th 11th 12th

Race/Ethnicity: (for statistical purposes only - optional)
Are you Hispanic/Latino? _____Yes _____No
Select one or more races:
___Black or African American  ___Asian  ___White
___ Native Hawaiian or Pacific Islander  ___American Indian or Alaska Native

School Information (only if different from Team Leader)

School Name: ___________________________ ETS Code: _______________________

School Address: __________________________________ City: _________________ Zip: __________

-----------------------------------------------

Student # 3 (Team Member) Information:

OSIS (required for NYC public HS students only): ____________________________

First Name: ___________________________ M.I. _____ Last Name: _________________________

Address: ___________________________________________________________ Apt#: __________

City: ___________________________ State: _______ Zip: __________ Home Phone: (____) __________________

E-mail: _______________________________________________ Cell Phone: (____) __________________

Date of Birth (mm/dd/yy): _____/____/____ Sex: M____ F____ Current Grade: 9th 10th 11th 12th

Race/Ethnicity: (for statistical purposes only - optional)
Are you Hispanic/Latino? _____Yes _____No
Select one or more races:
___Black or African American  ___Asian  ___White
___ Native Hawaiian or Pacific Islander  ___American Indian or Alaska Native

School Information (only if different from Team Leader)

School Name: ___________________________ ETS Code: _______________________

School Address: __________________________________ City: _________________ Zip: __________
To be completed by the Adult Sponsor in collaboration with the student researcher(s):

Student’s Name(s): _______________________

Project Title: ____________________________

1. I have reviewed the Intel ISEF Rules and Guidelines.

2. I have reviewed the student’s completed Student Checklist (1A) and Research Plan/Project Summary.

3. I have worked with the student and we have discussed the possible risks involved in the project.

4. The project involves one or more of the following and requires prior approval by an SRC, IRB, IACUC or IBC:
   - Humans
   - Potentially Hazardous Biological Agents
   - Vertebrate Animals
   - Microorganisms
   - rDNA
   - Tissues

5. Items to be completed for ALL PROJECTS
   - Adult Sponsor Checklist (1)
   - Research Plan/Project Summary
   - Approval Form (1B)
   - Regulated Research Institutional/Industrial Setting Form (1C) (when applicable; after completed experiment)
   - Continuation/Research Progression Form (7) (when applicable)

Additional forms required if the project includes the use of one or more of the following (check all that apply):

- Humans, including student designed inventions/prototypes. (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 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)
  - The following are exempt from prior review but require a Risk Assessment Form 3: projects involving protists, archaebacteria and similar microorganisms, for projects using manure for composting, fuel production or other non-culturing experiments, projects using color change coliform water test kits, microbial fuel cells, and projects involving decomposing vertebrate organisms.

- Hazardous Chemicals, Activities and Devices (No SRC prior approval required, see full text of the rules.)
  - Risk Assessment Form (3)
  - Qualified Scientist Form (2) (required for projects involving DEA-controlled substances or when applicable)

Adult Sponsor’s Printed Name ___________________________ Signature ___________________________ Date of Review (mm/dd/yy) ___________________________

Phone ___________________________ Email ___________________________
1) a. Student #1/Team Leader: __________________________ Grade: __________
   Email: __________________________ Phone: __________________________
b. Student #2/Team Member: __________________________
c. Student #3/Team Member: __________________________

2) Title of Project: __________________________________________
   __________________________________________
   __________________________________________

3) Adult Sponsor: __________________________ Phone/Email: __________________________

4) Indicate the start dates (projected or actual) of the following stages of your project (mm-dd-yyyy):
   a. Background/literature review: __________
   b. Set up or design of experimental conditions and methods, and/or training on equipment: __________
   c. Experimentation/data collection: __________
   d. Data analysis: __________

5) Will you be continuing data collection and analysis between January - May 2019?  ☐ Yes  ☐ No

6) If you indicated a start date before 01/01/18 on questions 4c or 4d above, this project may be considered a continuation from a previous year. Please provide the following:
   a. The previous year’s  ☐ Abstract or Project Summary  ☐ Form 1A*  and  ☐ Research Plan*
      * If submitted for previous NYCSEF competitions.
   b. Explain how this project is at a different stage, or is a new research question on ☐ Continuation Form 7.

7) Where will you conduct your experimentation? (check all that apply)
   ☐ Research Institution*  ☐ School  ☐ Field  ☐ Home  ☐ Other:
   * Please submit a Regulated Research Institution Form (1C).

8) List name and address of NON-SCHOOL work site(s):
   Name: __________________________
   Address: __________________________
   __________________________
   __________________________
   Phone/Email: __________________________

   Name: __________________________
   Address: __________________________
   __________________________
   __________________________
   Phone/Email: __________________________
The project summary is a succinct detailing of the rationale, research question(s), methodology, and risk assessment of your research project and should be completed after experimental research. This project summary must specifically address Part 1 clearly and concisely in 750 words or less. For most math, computer science, or engineering projects, the 4 sections of the project summary should be used to explain how you came up with and executed your project. Although your project may not fit each section directly, you must use the spaces provided to give detailed accounts regarding your project. Be sure to specifically and explicitly explain what aspects of the rationale, methodology and analysis were completed/contributed by YOU the student.

Part 1 of 4: What was the RATIONALE for your project? Please include a brief synopsis of the background research that supports your research problem and explain why this research is important scientifically and, if applicable, explain any potential societal impact of your research. Please include citations in your project rationale.

Part 2 of 4: State your HYPOTHESIS(ES) / RESEARCH QUESTION(S) / ENGINEERING GOAL(S) / EXPECTED OUTCOMES. Describe how your research question(s), hypothesis(es) and/or goal(s) build on the research described in your project rationale.

Part 3 of 4: Part A & B

PART A: Describe in detail your research methods and conclusions.
- Procedures/Data Collection: Detail experimental design, including all procedures used for data collection.
  - Be sure to describe in detail only those methods and procedures you (and your teammates) conducted, and not those of your mentor, teacher, or from any other researcher.
- Data Analysis: Describe the procedures to be used to analyze your data and answer your research question(s).
- At a minimum, preliminary data and conclusions MUST be described.

PART B: Be sure to address all questions in Part B that are relevant to your research project.
- HUMAN PARTICIPANTS (See pages 7-9 of the Rules and Guidelines)
  - 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 participant? Please include a copy of the survey or questionnaire (if used) in the research study and provide information as to how the survey questions will inform the research project.
  - Administration. Where was your survey given? Was it administered in school? Was it administered through a Registered Research Institution under the supervision of a Qualified Scientist?
  - 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.
- VERTEBRATE ANIMALS (See pages 10-12 of the Rules and Guidelines)
  - What POTENTIAL ALTERNATIVES to vertebrate animals were considered for this project? Be sure to present a detailed justification for use of vertebrate animals.
  - What procedures or methods that will be used to minimize potential discomfort, distress, pain and injury to the animals during the course of experimentation and any detailed chemical concentrations and drug dosages. Projects containing procedures classified as USDA Pain Category D or E are PROHIBITED for NYCSEF. Experiments that cause death of a vertebrate animal due to the experimental procedure are PROHIBITED.
  - Pain Category. Name the Pain Category associated with your project. Refer to Appendix I on page 5 of the Rules and Guidelines.
  - How many animals will be used in this study? Provide the species, strain, sex, age etc. of the animal and how the animals will be housed and cared for daily. Justify the number of animals planned for this study.
  - How will the animals be disposed of at the termination of the study? Experimental procedures involving toxicity studies, predator/vertebrate prey experiments, or studies where students performed euthanasia on a vertebrate animal are PROHIBITED for NYCSEF.
- POTENTIALLY HAZARDOUS BIOLOGICAL AGENTS (See pages 13-16 of the Rules and Guidelines)
  - Provide a description of the Biosafety Level Assessment process and BSL determination (see page 16 for details).
  - Where did you obtain the specimen, agent, source of specific cell line, etc.?
  - What safety precautions will be used during experimentation?
  - How will any potentially hazardous biological agents be disposed of at the end of the study?
- HAZARDOUS CHEMICALS, ACTIVITIES & DEVICES (See pages 17-19 of the Rules and Guidelines)
  - Provide a description of the Risk Assessment process and results.
  - Provide a brief summary of the chemical concentrations and drug dosages that will be used in experimentation.
  - What safety precautions and procedures will be used to minimize risk to the student researcher, others and the environment?
  - How will any hazardous chemicals or materials be disposed of at the end of the study?

Part 4 of 4: Provide a list of AT LEAST FIVE (5) MAJOR REFERENCES used to form the basis of your research project. References must be from science journal articles, books, or other publications. Encyclopedias and Internet search engines (e.g. Google, Yahoo, WebMD, Wikipedia, etc.) are not considered as major references and WILL NOT be accepted.
The project summary is a succinct detailing of the rationale, research questions, methodology and risks of your research project and should be written upon completion of your experimental research. This project summary must specifically address Part 1 CLEARLY and CONCISELY in 750 words or less.

Part 1 of 4: What is the RATIONALE for your project? Please include a brief synopsis of the background research that supports your research problem and explain why this research is important scientifically and, if applicable, explain any potential societal impact of your research. Be very specific and clear, detailing what ideas were contributed to this project by YOU the student. Please include citations in your project rationale.

Title
Student’s Name(s)
School Name

Start typing the body of your rationale here beginning at the left margin
The project summary is a succinct detailing of the rationale, research questions, methodology and risks of your research project and should be written upon completion of your experimental research. This project summary must specifically address Part 2 clearly and concisely in 250 words or less.

Part 2 of 4: State your HYPOTHESIS(ES) / RESEARCH QUESTION(S) / ENGINEERING GOAL(S) / EXPECTED OUTCOMES. Describe how your research question(s), hypothesis(es) and/or goal(s) build on the research described in your project rationale. Be very specific and clear detailing what ideas and methods during experimentation were completed/contributed to this project by YOU the student.

Start typing the body of your hypothesis or goal here beginning at the left margin.
The project summary is a succinct detailing of the rationale, research questions, methodology and risks of your research project and should be written upon completion of your experimental research. Please note that this is to be submitted as part of your online registration.

Part 3 of 4: State your RESEARCH METHODS/ANALYSIS and address PART B QUESTIONS below. Be very specific and clear detailing what ideas and analytical methods completed/contributed to this project by YOU the student.

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Start typing your research methods, analysis, and Part B here beginning at the left margin.
The project summary is a succinct detailing of the rationale, research questions, methodology and risks of your research project and should be written upon completion of your experimental research. This project summary must specifically address Part 4 clearly and concisely in 250 words or less.

Part 4 of 4: Provide a list of AT LEAST FIVE (5) MAJOR REFERENCES used to form the basis of your research project. References must be from science journal articles, books, or other publications. Encyclopedias and Internet search engines (e.g. Google, Yahoo, WebMD, Wikipedia, etc.) are not considered as major references and WILL NOT be accepted.

Start typing your list of major references here beginning at the left margin.
After finishing research and experimentation, you are required to write a (maximum) 500 word, one-page abstract. Your abstract should include the following: a) purpose of the experiment, b) procedure, c) data, and d) conclusions. It may also include any possible research applications. Only minimal reference to previous work may be included. An abstract must NOT include the following: a) acknowledgments (including naming the research institution and/or mentor with which you were working), or self-promotions and external endorsements b) work or procedures done by the mentor.

Title
Student’s Name(s)

School Name

Start typing the body of your abstract here beginning at the left margin.

1. Student(s) independently performed all procedures as outlined in the abstract. □ Yes □ No
2. Student(s) worked or used equipment in a site other than school, field, or home. □ Yes □ No
3. This project is a continuation of previous research. □ Yes □ No

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
1. To Be Completed by Student and Parent
   a. Student Acknowledgment:
      • I understand the risks and possible dangers to me of the proposed research plan.
      • I have read the Intel ISEF Rules and Guidelines and will adhere to all International Rules when conducting this research.
      • I have read and will abide by the following Ethics statement

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

   Student’s Printed Name                           Signature                          Date Acknowledged (mm/dd/yy)
   (Must be prior to experimentation.)

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

   Parent/Guardian’s Printed Name                  Signature                          Date Acknowledged (mm/dd/yy)
   (Must be prior to experimentation.)

2. To be completed by the local or affiliated Fair SRC
   (Required for projects requiring prior SRC/IRB APPROVAL. Sign 2a or 2b as appropriate.)

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

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

      SRC/IRB Chair’s Printed Name
      Signature                          Date of Approval (mm/dd/yy)
      (Must be prior to experimentation.)

   OR

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

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

      SRC Chair’s Printed Name
      Signature                          Date of Approval (mm/dd/yy)

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

   SRC Approval After Experimentation and Before Competition at Regional/State/National Fair
   I certify that this project adheres to the approved Research Plan/Project Summary and complies with all Intel ISEF Rules.

   Regional SRC Chair’s Printed Name  Signature  Date of Approval (mm/dd/yy)

   State/National SRC Chair’s Printed Name  (where applicable)  Signature  Date of Approval (mm/dd/yy)
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 be on the form as it is required to be displayed at student’s project booth; please do not print double-sided.)

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

1. Did you or your proxy (e.g. graduate student, postdoc, employee) mentor or provide substantial guidance to the student researcher? 
   a. If no, describe your and/or your institution’s role with the student researcher and his/her project (e.g. supervised use of equipment on site without ongoing mentorship and sign below.)
   
   b. If yes, complete questions 2–5.

2. Is the student’s research project a subset of your ongoing research or work? 
   Use questions 3, 4 and 5 to detail how the student’s project was similar and/or different from ongoing research or work at your site.

3. Describe the independence and creativity with which the student:
   a. developed the hypotheses or engineering goals for the research project

   b. designed the methodology for his/her research project

   c. analyzed and interpreted data

(Continued on next page)
Student’s Name(s) ____________________________________________

4. Detail the student’s role in conducting the research (e.g. data collection, specific procedures performed). Differentiate what the student observed and what the student actually did.

5. Did the student(s) work on the project as part of a group?  
   − Yes  − No

   If yes, how many individuals were in the group and who were they (e.g. high school students, graduate students, faculty, professional researchers)?

I attest that the student has conducted the work as indicated above and that any required review and approval by institutional regulatory board (IRB/IACUC/IBC) has been obtained. Copies are attached if applicable.

I further acknowledge that the student will be presenting this work publicly in competition and I have communicated with the student research regarding any requirements for my review and/or restrictions of what is publicized.

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<th>Supervising Adult’s Printed Name</th>
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<th>Institution</th>
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Qualified Scientist Form (2)
May be required for research involving human participants, vertebrate animals, potentially hazardous biological agents, and hazardous substances and devices. Must be completed and signed before the start of student experimentation.

Student’s Name(s) 
Title of Project 

To be completed by the Qualified Scientist:

Scientist Name: __________________________
Educational Background: __________________________ Degree(s): __________________________
Experience/Training as relates to the student’s area of research: __________________________

Position: __________________________ Institution: __________________________
Address: __________________________ Email/Phone: __________________________

1) Have you reviewed the Intel ISEF rules relevant to this project?  
   □ Yes  □ No

2. Will any of the following be used?  
   a. Human participants  
   □ Yes  □ No
   b. Vertebrate animals  
   □ Yes  □ No
   c. Potentially hazardous biological agents (microorganisms, rDNA and tissues, including blood and blood products)  
   □ Yes  □ No
   d. Hazardous substances and devices  
   □ Yes  □ No

3. Will this study be a sub-set of a larger study?  
   □ Yes  □ No

4. Will you directly supervise the student?  
   a. If no, who will directly supervise and serve as the Designated Supervisor?  
   __________________________
   Experience/Training of the Designated Supervisor: __________________________

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

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

Designated Supervisor’s Printed Name
Signature  Date of Approval (mm/dd/yy)

Phone  Email

Page 38
Risk Assessment Form (3)
Must be completed before experimentation.

Student’s Name(s) _____________________________________________________________

Title of Project _______________________________________________________________________________________

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

1. List all hazardous chemicals, activities, or devices that will be used; identify microorganisms exempt from pre-approval (see Potentially Hazardous Biological Agent rules).

2. Identify and assess the risks involved in this project.

3. Describe the safety precautions and procedures that will be used to reduce the risks.

4. Describe the disposal procedures that will be used (when applicable).

5. List the source(s) of safety information.

To be completed and signed by the Designated Supervisor (or Qualified Scientist, when applicable):
I agree with the risk assessment and safety precautions and procedures described above. I certify that I have reviewed the Research Plan/Project Summary and will provide direct supervision.

Designated Supervisor’s Printed Name ___________________________ Signature ___________________________ Date of Review (mm/dd/yy)

Position & Institution __________________________________________________________ Phone or email contact information ___________________________________________________________________________

Experience/Training as relates to the student’s area of research

Human Participants Form (4)

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

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<th>Student’s Name(s)</th>
<th>Title of Project</th>
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Adult Sponsor

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

1. ← I have submitted my Research Plan/Project Summary which addresses ALL areas indicated in the Human Participants Section of the Research Plan/Project Summary Instructions.
2. ← I have attached any surveys or questionnaires I will be using in my project or other documents provided to human participants. □ 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? If yes, attach the Qualified Scientist Form 2.

BELOW - IRB USE ONLY

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

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

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

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, that the checkboxes above have been completed to indicate the IRB determination and that I agree with the decisions above.

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

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<th>Printed Name</th>
<th>Degree/Professional License</th>
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<td>Signature</td>
<td>Date of Approval (Must be prior to experimentation.) (mm/dd/yy)</td>
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Educator

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<th>Printed Name</th>
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<td>Signature</td>
<td>Date of Approval (Must be prior to experimentation.) (mm/dd/yy)</td>
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School Administrator

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<th>Printed Name</th>
<th>Degree/Professional License</th>
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<td>Signature</td>
<td>Date of Approval (Must be prior to experimentation.) (mm/dd/yy)</td>
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</table>
Human Informed Consent Form

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

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

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

Student Researcher(s): _______________________________________________________
Title of Project: ____________________________________________________________

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

Purpose of the project:

If you participate, you will be asked to:

Time required for participation:

Potential Risks of Study:

Benefits:

How confidentiality will be maintained:

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

Adult Sponsor/QS/DS: _____________________________ Phone/email: ________________

Voluntary Participation:

Participation in this study is completely voluntary. If you decide not to participate there will not be 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: _____________________________ (mm/dd/yy)
Research Participant Printed Name: _____________________________ Signature: ________________

Parental/Guardian Permission (if applicable)
Date Reviewed & Signed: _____________________________ (mm/dd/yy)
Parent/Guardian Printed Name: _____________________________ Signature: ________________
**Student’s Name(s)**

To be completed by Student Researcher:

1. Common name (or Genus, species) and number of animals used.

2. Describe completely the housing and husbandry to be provided. Include the cage/pen size, number of animals per cage, environment, bedding, type of food, frequency of food and water, how often animal is observed, etc. Add an additional page as necessary.

3. What will happen to the animals after experimentation?

4. Attach a copy of wildlife licenses or approval forms, as applicable

5. The Intel ISEF Vertebrate Animal Rules require that any death, illness or unexpected weight loss be investigated and documented by a letter from the qualified scientist, designated supervisor or a veterinarian. If applicable, attach this letter with this form when submitting your paperwork to the SRC prior to competition.

---

**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.)

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<table>
<thead>
<tr>
<th>To be completed by Local or Affiliate Fair Scientific Review Committee (SRC) BEFORE experimentation.</th>
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<tr>
<td><strong>Level of Supervision Required for agricultural, behavioral or nutritional studies:</strong></td>
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<tr>
<td>□ Designated Supervisor REQUIRED. Please have applicable person sign below.</td>
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<tr>
<td>□ Veterinarian and Designated Supervisor REQUIRED. Please have applicable persons sign below.</td>
</tr>
<tr>
<td>□ Veterinarian, Designated Supervisor and Qualified Scientist REQUIRED. Please have applicable persons sign below and have the Qualified Scientist complete Form (2).</td>
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The SRC has carefully reviewed this study and finds it is an appropriate study that may be conducted in a non-regulated research site.

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

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<thead>
<tr>
<th>SRC Chair Printed Name</th>
<th>Signature</th>
<th>Date of Approval (must be prior to experimentation) (mm/dd/yy)</th>
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**To be completed by Veterinarian:**

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

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

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

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**Vertebrate Animal Form (5B)**

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

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<td>Title and Protocol Number of IACUC Approved Project</td>
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**To be completed by Qualified Scientist or Principal Investigator:**

1. Species of animals used: ____________________________ Number of animals used: _______

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

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

4. Did the student’s project also involve the use of tissues?
   - [ ] Yes; complete Forms 6A and 6B
   - [ ] No

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.

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<th>Qualified Scientist/Principal Investigator</th>
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Student Name(s) ____________________________________________

Title of Project

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

SECTION 1: PROJECT ASSESSMENT

1. Identify potentially hazardous biological agents to be used in this experiment. Include the source, quantity and the biosafety level risk group of each microorganism.

2. Describe the site of experimentation including the level of biological containment.

3. Describe the procedures that will be used to minimize risk (personal protective equipment, hood type, etc.).

4. What final biosafety level do you recommend for this project given the risk assessment you conducted?

5. Describe the method of disposal of all cultured materials and other potentially hazardous biological agents.

SECTION 2: TRAINING

1. What training will the student receive for this project?

2. Experience/training of Designated Supervisor as it relates to the student’s area of research (if applicable).

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

☐ Experimentation on the microorganisms/cell lines/tissues used in this study will NOT be conducted at a Regulated Research Institution, but will be conducted at a (check one) BSL-1 or BSL-2 laboratory. This study has been reviewed by the local SRC and the procedures have been approved prior to experimentation.

☐ Experimentation on the microorganisms/cell lines/tissues used in this study will be conducted at a Regulated Research Institution and was approved by the appropriate institutional board prior to experimentation; institutional approval forms are attached.

Origin of cell lines: ___________________________ Date of IACUC/IBC approval ___________________________

☐ Experimentation on the microorganisms/cell lines/tissues used in this study will be conducted at a Regulated Research Institution, which does not require pre-approval for this type of study. The SRC has reviewed that the student received appropriate training and the project complies with Intel ISEF rules.

CERTIFICATION - To be SIGNED by the QUALIFIED SCIENTIST or DESIGNATED SUPERVISOR

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

QS/DS Printed Name ___________________________ Signature ___________________________

Date of review (mm/dd/yy) ___________________________

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

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

SRC Printed Name ___________________________ Signature ___________________________

Date of review (mm/dd/yy) ___________________________
Human and Vertebrate Animal Tissue Form (6B)

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

Student’s Name(s)

Title of Project

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

1. What vertebrate animal tissue will be used in this study? Check all that apply.
   - □ Fresh or frozen tissue sample
   - □ Fresh organ or other body part
   - □ Blood
   - □ Body fluids
   - □ Primary cell/tissue cultures
   - □ Human or other primate established cell lines

2. Where will the above tissue(s) be obtained. If using an established cell line include source and catalog number.

3. If the tissue will be obtained from a vertebrate animal study conducted at a research institution attach a copy of the IACUC certification with the name of the research institution, the title of the study, the IACUC approval number and a copy 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 U.S. Occupational Safety and Health Act, 29CFR, Subpart Z, 1910.1030 - Blood Borne Pathogens.

<table>
<thead>
<tr>
<th>Printed Name</th>
<th>Signature</th>
<th>Date of Approval (mm/dd/yy)</th>
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<td>(Must be prior to experimentation.)</td>
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<th>Title</th>
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Institution
**Continuation/Research Progression Projects Form (7)**

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

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<thead>
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<th>Student’s Name(s)</th>
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**To be completed by Student Researcher:** List all components of the current project that make it new and different from previous research. The information must be on the form; use an additional form for 2016–2017 and earlier projects.

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<tbody>
<tr>
<td>1. Title</td>
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<td>2. Change in goal/ purpose/objective</td>
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<td>3. Changes in methodology</td>
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<td>4. Variable studied</td>
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<td>5. Additional changes</td>
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Attached are:

- □ 2017–2018 Abstract and Research Plan/Project Summary

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.

<table>
<thead>
<tr>
<th>Student’s Printed Name(s)</th>
<th>Signature</th>
<th>Date of Signature (mm/dd/yy)</th>
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