

For information only. Do not include this page in your application.

Research Plan and Attachment

Required For All Projects

A complete research plan must accompany the Student Checklist Form (1A). Additional pages must be included from one of the 4 options for the Detailed Research Plan located on the website at <https://science-fair.org/rules-and-registration/forms/>

The **Research Plan** is a succinct detailing of the rationale, research question(s), methodology, and risk assessment of your research project and should be completed before experimentation. For all projects requiring preapproval, this document must be reviewed and approved by the appropriate approval committee (e.g. IRB, IACUC, SRC) before experimentation. ALL changes made to the original plan should be added to the final document as part of the Post Project Summary. For projects not requiring preapproval, this document may be completed either pre- or post-experimentation.

The Research Plan and Post Project Summary should include the following::

- a. What is the **RATIONALE** for your project? Include a brief synopsis of the background that supports your research problem and explain why this research is important scientifically and if applicable, explain any societal impact of your research.
- b. State your **HYPOTHESIS(ES), RESEARCH QUESTION(S), ENGINEERING GOAL(S), EXPECTED OUTCOMES**. How is this based on the rationale described above
- c. Describe the following in detail:

Procedures: Detail all procedures and experimental design including methods for data collection.

Describe only your project. Do not include work done by mentor or others.

Risk and Safety: Identify any potential risks and safety precautions needed.

Data Analysis: Describe the procedures you will use to analyze the data/results that answer research questions or hypotheses.

Discussion of Results and Conclusions: Discuss the data/results and the conclusions that can be drawn.

d. Bibliography: List at least five (5) major references (e.g. science journal articles, books, internet sites) from your literature review. If you plan to use vertebrate animals, one of these references must be an animal care reference.

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

1. Human participants research:

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

2. Vertebrate animal research:

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

3. Potentially hazardous biological agents research:

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

4. Hazardous chemicals, activities & devices:

- Describe Risk Assessment process and results
- Detail chemical concentrations and drug dosages
- Describe safety precautions and procedures to minimize risk
- Discuss methods of disposal.

Checklist for Adult Sponsor (1)

This completed form is required for ALL projects.
Full text of the rules available at www.societyforscience.org/isef

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

Student's Name(s): _____

Project Title: _____

- 1) I have reviewed the Intel ISEF Rules and Guidelines.
- 2) I have reviewed the student's completed Student Checklist (1A) and Research Plan.
- 3) I have worked with the student and we have discussed the possible risks involved in the project.
- 4) The project involves one or more of the following and requires prior approval by an SRC, IRB, IACUC or IBC:

Human	Potentially Hazardous Biological Agents:	
Vertebrate Animals	Microorganisms	rDNA Tissues
- 5) Forms to be completed for **ALL PROJECTS**

Adult Sponsor Checklist (1)	Research Plan
Student Checklist (1A)	Parental Approval Form (1B)
Regulated Research Institutional/Industrial Setting Form (1C) (when applicable. Submit <u>after</u> completed experiment)	
Continuation Form (7) (when applicable)	

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

- Humans** (Requires prior approval by an Institutional Review Board (IRB); see full text of the rules.)
 - Human Participants Form (4) or appropriate Institutional IRB documentation
 - Sample of Informed Consent Form (when applicable and/or required by the IRB)
 - Qualified Scientist Form (2) (when applicable and/or required by the IRB)
- Vertebrate Animals** (Requires prior approval, see full text of the rules.)
 - Vertebrate Animal Form (5A)—for projects conducted in a school/home/field research site (SRC prior approval required.)
 - Vertebrate Animal Form (5B)—for projects conducted at a Regulated Research Institution. (Institutional Animal Care and Use Committee (IACUC) approval required prior experimentation.)
 - Qualified Scientist Form (2) (Required for all vertebrate animal projects at a regulated research site or when applicable)
- Potentially Hazardous Biological Agents** (Requires prior approval by SRC, IACUC or Institutional Biosafety Committee (IBC).)
 - Potentially Hazardous Biological Agents Risk Assessment Form (6A)
 - Human and Vertebrate Animal Tissue Form (6B)—to be completed in addition to Form 6A when project involves the use of fresh or frozen tissue, primary cell cultures, blood, blood products and body fluids.
 - Qualified Scientist Form (2) (when applicable)
 - Risk Assessment Form (3) required for projects involving protists, archae and similar microorganisms, for projects using manure for composting, fuel production, or other non-culturing experiments, for projects using color change coliform water test kits, microbial fuel cells, and for projects involving decomposing vertebrates.
- Hazardous Chemicals, Activities and Devices** (Prior approval is strongly recommended).
 - Risk Assessment Form (3)
 - Qualified Scientist Form (2) (required for projects involving DEA-controlled substances or when applicable).

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Phone _____ Email _____

Approval Form (1B)

Each participant is required to complete this form.

1) REQUIRED FOR ALL PARTICIPANTS.

a) Student Acknowledgment:

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

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

Student's Printed Name

Signature

Date Acknowledged
(Must be prior to experimentation.)

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

Parent/Guardian's Printed Name

Signature

Date of Approval
(Must be prior to experimentation.)

Student's school information and/or photographs may be published to promote the Synopsys Championship

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2) TO BE COMPLETED BY THE SRC (Safety Review Committee)

(REQUIRED FOR PROJECTS REQUIRING PRIOR SRC/IRB APPROVAL. SIGN 2a OR 2b AS APPROPRIATE.)

a) Required for projects that need prior SRC/IRB approval BEFORE experimentation

(humans, vertebrates or potentially hazardous biological agents)

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

SRC/IRB Chair's Printed Name

Signature

Date of Approval
(Must be prior to experimentation.)

OR

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

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

SRC/IRB Chair's Printed Name

Signature

Date of Approval

NOTE: If a stamp is used, it must be initialed by the chairperson.

3) FINAL ISEF AFFILIATED FAIR SRC APPROVAL.

(REQUIRED FOR ALL PROJECTS)

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

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

Regional SRC Chair's Printed Name

Signature

Date of Approval

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

Signature

Date of Approval

Minimum QUALITY STANDARDS

Find the type of project you are doing from the list below and review the minimum requirements for project acceptance. Make sure that the information described in the requirements list is included in the Research Plan attachment of your application. Detailed research plans are at <https://science-fair.org/rules-and-registration/forms/>

Types of Science Fair Projects

Science Project:	investigates the effects of changes or answers the question "Why?"
Engineering Project:	solves a need or problem, and includes measurements of success.
Product Testing Project:	tests and compares similar items using measurable endpoints.
Human Participants Project:	uses humans to determine a science or engineering question.
Demonstration Project:	shows how something works [<i>not accepted at this fair</i>].

Science Project minimum requirements

1. Subject: defines a testable question that begins Why?... or What is effect of a change in X on Y?
(for example, 'What is the effect of a change in the amount of sunlight on the growth of tomato plants').
2. Bibliography: include references from your literature research.
3. Hypothesis based on your library research and knowledge. It is your best estimate of what will happen.
4. Experimental design
 - Define a control (a "standard" group) to which all test groups will be compared.
 - Define testgroups where only one variable differs from the "control" group.
 - Define the measurable endpoint(s).
 - Each test group should contain a minimum of 3 objects being tested (seed, plant, rat, etc.). A group size of atleast 10 is required for projects with human participants.
 - Plan to change only one variable in each test cycle. However, change the variable in several ways (several concentrations of a chemical, several temperatures, or several time points etc.).
 - Report measurements in metricunits when possible.
 - Repeat the test more than once to see if your results are reproducible.

Engineering Project minimum requirements

1. Clearly define the problem or need the engineering project will solve.
2. Include bibliography from your literature research.
3. List designcriteria and designconstraints
 - Design criteria = physical and functional characteristics of the design (shape, weight, etc).
 - Design constraints/limitations (cost, time, available materials, etc).
4. Clearly state success criteria. What will you measure to see if your design worked?
5. Report measurements in metric units where possible.

Product Testing Project minimum requirements [*Grades 6 through 8 only*]

1. Clearly identify what kind of item (soap, fabric, etc.) you plan to test.
2. Define a test group of at least three similar items (Grades 6 and 7) or four similar items (Grade 8).
3. Include test criteria that:
 - Define what will be measured.
 - Describe how you will take measurements.
 - Report measurements in metric units, when possible.
 - Define criteria for "the best" (cleanest, largest, coldest, etc).
 - Repeat the test more than once to see if your results are reproducible.

Demonstration Projects show or explain "how something works".

Demonstration Projects are notaccepted at the Synopsys Championship. What interests you about your project? Can you channel your interest into a Science, Engineering, or Product Testing Project? Ask your teacher for help. A demonstration often can be turned into an experimental science project by asking how something (another factor) affects the functioning of the item. Also, if a student likes to build things, a demonstration might become an engineering project.

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Human Participants Research Projects

Details of the rules for Human Participants projects are available in Pages 8 through 10 of the **2017 Rules and Guidelines** (PDF) available from the Intel ISEF website at

<https://student.societyforscience.org/Intel-Isef-forms>.

Minimum quality guides involve having at least 10 human participants and having a quantifiable, measurable endpoint. Projects usually need to specifically address issues of randomization of trials (not mixing up treatments, or ignoring learning from participating previously). Many student applicants fail to fully complete the Human Subjects Detailed Research plan, or fail to include a complete sample test or sample Informed Consent Form for us to review.

Subjects may NOT be asked to ingest foods without proper medical supervision and/or as a reward for participation.

Student Permission and Hold Harmless Agreement

Santa Clara Valley Science and Engineering Fair Association

I _____, as the parent/guardian of _____, approve my child's participation in the Santa Clara Valley Science & Engineering Fair (Synopsis Championship), and assume responsibility for the oversight of the scientific research conducted by my child in association with the teachers/mentors as listed in my child's application packet.

I understand the Synopsis Championship is affiliated with the Intel International Science & Engineering Fair (Intel ISEF), and that the Intel ISEF rules, which are publicly available from the Intel ISEF web page, <http://www.societyforscience.org/isef/rulesandguidelines>, apply fully to the Synopsis Championship competition. My child and I are fully responsible for reading, understanding and adhering to the Intel ISEF rules. Failure to comply will result in rejection of my child's science project application and/or disqualification of the child's project entry at the actual event even if the application was approved.

I understand that Synopsis Championship high school division grand prize winners are invited to compete at the Intel ISEF, and that middle school grand prize winners can compete at the California State Science Fair (CSSF).

I give permission to Synopsis Championship and any news media in attendance at the Synopsis Championship, Intel ISEF and CSSF to photograph, videotape, and interview my child during the fair(s) and agree that recordings may be used, reproduced, and distributed without restriction by the Synopsis Championship, participating Santa Clara County school districts, and news media in news stories, publications and promotional activities.

I agree to hold harmless the Synopsis Silicon Valley Science & Technology Outreach Foundation, Santa Clara Valley Science & Engineering Fair Association and their employees, agents and contractors against any liability and any claims resulting from my child's participation in the Synopsis Championship, and the subsequent CSSF and Intel ISEF events.

Date _____ Parent/Guardian **Signature:** _____

Note: Submission of this permission and hold harmless form, along with the required application packet and processing fee, does not connote acceptance of your child's project for the Synopsis Championship. Your child will be officially notified regarding his/her project acceptance (after review and approval of the application) by a posting of the word 'Approved' on the website, www.science-fair.org, (where the project will be listed by teacher). Please use the 'Project Status' link on the website homepage. The application processing fee is NOT refundable.

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REMINDER__

The MOST IMPORTANT document to include in your application__

Page 2, item #10 of this application requires you to submit a project proposal describing your research project *in detail*.

Choose ONE of the following research plan proposals (depending on the design of your project):

- (1) Product Testing Project (grades 6-8 only) or
- (2) Scientific Research Project (grades 6-12) or
- (3) Engineering Project (grades 6-12) or
- (4) Human Participants Research Project (grades 6-12).

Forms for these 4 project types are available in WORD format on the FORMS page of our website. <https://science-fair.org/rules-and-registration/forms/>