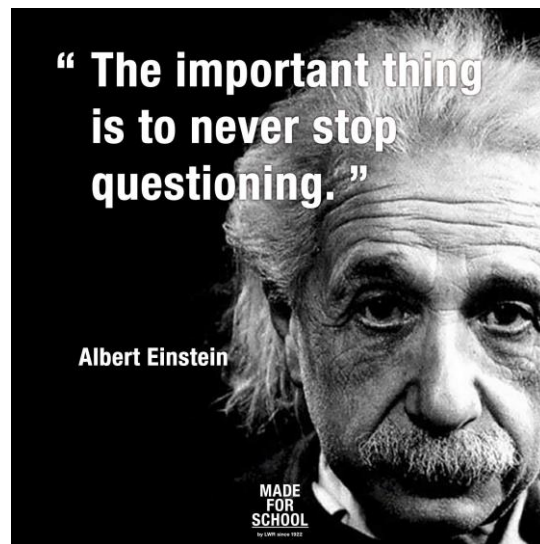
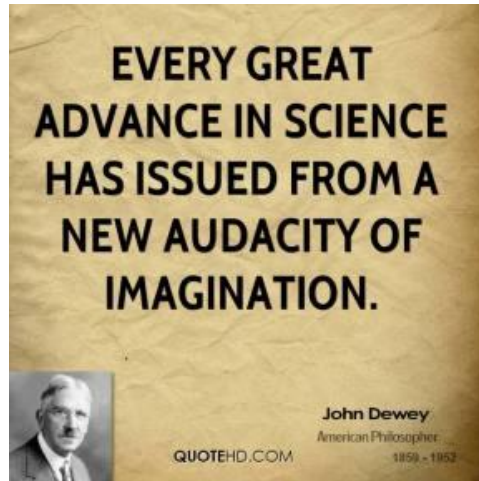


Science Fair Experimental Research Project Student Guidebook



*General Ray Davis Middle School and
The Academy for Visual and Performing Arts*



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Purpose for Project

The purpose of the Science Fair project is to teach students how to use the scientific inquiry process to solve real-world problems. Students will use the process of scientific inquiry in grades 6-8 at General Ray Davis Middle School in order to adequately equip them for high school and college.

Georgia Performance Standard

SCS9. Students will understand the features of the process of scientific inquiry.

Students will apply the following to inquiry learning practices:

- a. Investigations are conducted for different reasons, which include exploring new phenomena, confirming previous results, testing how well a theory predicts, and comparing different theories. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence.
- b. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence.
- c. Scientific experiments investigate the effect of one variable on another. All other variables are kept constant.
- d. Scientists often collaborate to design research. To prevent this bias, scientists conduct independent studies of the same questions.
- e. Accurate record keeping, data sharing, and replication of results are essential for maintaining an investigator's credibility with other scientists and society.
- f. Scientists use technology and mathematics to enhance the process of scientific inquiry.
- g. The ethics of science require that special care must be taken and used for human subjects and animals in scientific research. Scientists must adhere to the appropriate rules and guidelines when conducting research.

Scientific Inquiry

What is the Scientific Method?

The scientific method, simply put, is a process that is the basis for scientific inquiry. The scientific method follows a series of steps:

1. Identify a Problem
2. Gathering Information
3. Formulate a Hypothesis
4. Test the Hypothesis
5. Observe and Collect Data
6. Analyze the Data
7. Draw Conclusions

What is a hypothesis?

A *hypothesis* is what you think will happen during your experiment (test). For example, if your question or experiment is “does baking soda affect the temperature of water?” then what you think will happen is your *hypothesis*. In this case, the *hypothesis* would be: “If baking soda is added to water, then the temperature of the water will increase.

What are the controls and variables?

A *control* is the item in the experiment that will NOT change. In the example above, the **control** would be the water. For each experiment, the amount of water will remain the same.

The *independent variable* is what you change. In this example, the *independent variable* would be the amount of baking soda. This is what you will change.

The *dependent variable* is what changes in response to the independent variable. In this example, the *dependent variable* would be the temperature of the water.

How many times do I have to do my test?

The more times you repeat your experiment, the more data you will collect. The more data collected, the more accurate and reliable are the results. It is suggested that the procedure, or experiment, be done a minimum of three times.

How do I write the procedure?

Think about how you will perform your experiment. Take the time to write a step-by-step list of instructions.

Science Fair at a Glance

All projects entered into the DMS Science Fair must meet the following criteria before judging begins:

1. Paperwork

- Due to your Science teacher by Friday, September 19, 2014

2. DMS Science Fair Dates

- Project Setup: Monday and Tuesday, December 8-9, 2014
- Judging: Wednesday and Thursday, December 10-11, 2014

3. Log Book

4. Forms

Visit <https://student.societyforscience.org/forms> to fill in (complete) and print out your forms

- Form 1- Checklist for Adult Sponsor/Safety Assessment (**REQUIRED of all students**)
- Form 1A – Student Checklist/Research Plan (**REQUIRED of all students**)
- Form 1B – Approval Form (**REQUIRED of all students**)
- Abstract – (**REQUIRED of all students**)
- Any other required forms based on your project

You MUST complete all required forms for your project BEFORE you begin any experiments. All forms must be submitted you your teacher, who then submits them to our IRB/SRC for approval. Failure to do so, will disqualify your project from the DMS Science Fair.

5. Final Paper

1. Title Page
2. Table of Contents
3. Abstract
4. Introduction
5. Literature Review
6. Methodology
7. Data and Observations
8. Analysis and Discussion of Data
9. Conclusions
10. Literature Cited
11. Appendix

Formatting for Final Paper

- Typed
- Font: Calibri or Times Roman
- Font Size: 11 or 12, no larger
- Spacing: Double (which is the same as normal formatting)
- Black Ink only for printing

6. Display Board

Suggested Timeline

| WEEK | OBJECTIVE(S) | SUGGESTION |
|---|--|---|
| September 1-12 (weeks 1 & 2) | Prepare your Log Book Develop your Topic Gather Research to help you develop your hypothesis. | Log Book <ul style="list-style-type: none"> Get tabs for your logbook and label the sections. Visit DMS homepage for topics. Topics <ul style="list-style-type: none"> Work on developing your topic |
| September 15-26 (week 3-4) | Develop your Topic, if needed Gather Research to help you develop your hypothesis. Complete Science Fair Paperwork Science Fair Paperwork Due Friday, September 19th | Continue gathering research. <ul style="list-style-type: none"> Complete Science Fair Paperwork Forms 1, 1A, 1B To complete and print forms, visit http://www.societyforscience.org/Page.aspx?pid=282 After school sessions (Media Center) <ul style="list-style-type: none"> Monday, September 15th Monday September 22nd 4 pm – 6 pm |
| September 29 - October 3 (week 5) | Continue researching. | Start TYPING the rough draft of your paper – introduction, literature review, and methodology. After school session (Media Center) <ul style="list-style-type: none"> Monday, September 29th 4 pm – 6 pm |
| October 6-10 (week 6) FALL BREAK | Start drafting a TYPED copy of your paper. | Start TYPING the rough draft of your paper – introduction, literature review, and methodology. |
| October 13-17 (week 7) | Start drafting a TYPED copy of your paper. Start your experiment if you have not already done so! Record in your log book. | Carry-out your experiment (complete at least three trials). Make observations and record. Remember measuring is important. Be accurate!!!! After school session (Media Center) <ul style="list-style-type: none"> Monday, October 13th 4 pm – 6 pm |
| October 20-24 (week 8) | Continue your experiment. | Remember to record your data and observations, using ink, in your log book. ITBS testing this week – no after school session this week! |
| October 27-31 (week 9) | Start bringing your project to an end! | Organize your data using a spreadsheet. Start analyzing (explain data). After school session: <ul style="list-style-type: none"> Monday, October 27th 4 pm to 6 pm |
| November 3-7 (week 10) | Prepare final paper for submission | Prepare final paper for next week Revise: make corrections; proofread Print out final copy and have it ready to turn in! After school sessions (Media Center) <ul style="list-style-type: none"> WEDNESDAY, November 5th 4 pm – 6 pm |
| November 10-21 (weeks 11 & 12) | Submit final paper (Depends on your teacher) | Prepare OFFICIAL abstract Get materials for display – follow ISEF guidelines for size! |
| November 24-28 (week 13) | Work on Science Fair Display – follow ISEF guidelines! | Thanksgiving Break – No School |
| December 1-5 (week 14) | Get ready for the DMS Fair! | Finish your Science Fair Display – follow ISEF guidelines! |
| December 8-12 (week 15) | Prepare for the DMS Science Fair <ul style="list-style-type: none"> Project Setup: Mon/Tues, December 8-9, 2014 Judging: Wed/Thurs, December 10-11, 2014 | Enter visual display Winners of the DMS fair will complete and submit paperwork for the Regional Fair next week |
| December 15-19 (week 16) | Prepare and submit paperwork for the RRSEF | January 29-30, 2015 – RRSEF at Magnet. Detailed information will be provided. |

How to Prepare and Use a Log Book

Before you begin your project, get a LOG BOOK! The log book is a record of everything that you complete for your project. Think of it as “The Diary” of your project. A few important things to keep in mind for your log book:

1. Use **BLUE or BLACK INK** only absolutely **NO PENCIL**.
2. **Do not tear out any pages from your log book.**
3. **DATE EACH ENTRY.**
4. **Draw one line through mistakes, do not SCRIBBLE and try to black out the mistake.**

Suggested Log Book Set Up

- Use a **NEW** Composition Notebook.
- Number each page in the logbook with **BLUE OR BLACK INK** (front and back of each page)
- Outside Cover
 - First and Last Names (**no preferred or nicknames**)
 - Teacher, DMS
 - Grade Level
- Invest in something to make tabs for the sections of your Log Book.
- Make a tab for each section on the page listed.
- Pages 1-2 - Table of Contents**
- Page 3 – Daily Research Notes and Review**
 - Record what you are doing in the media center and outside of class to develop a topic, sources you reviewed, etc.
- Page 15 – Literature Reviews (Research)**
 - Summarize each article with at least five sentences.
 - Provide APA citations for each source.
 - Include at least three sources that contain information about your procedures.
 - Make sure you clearly state your research question.
- Page 51 – Experimental Design**
 - Restate your research question
 - Independent variable(s)
 - Dependent variable (s)
 - Control(s)
 - Hypothesis
- Page 53 – Methodology**
 - List materials.
 - Summarize procedures.
 - Include participant or sampling information (if relevant).
 - Explain any safety and/or waste disposal information (if project requires).
 - Draft of surveys, questionnaires, etc. (if relevant).
- Page 65 – Data and Observations**
 - Record DATES!
 - Organize your data into tables.
 - Make a detailed record of what you observe, measure, etc. during your experiment.
 - Must have at least three trials.
- Page 81 – Analysis of and Discussion of Data**
 - Summarize your data you collected.
- Page 91 – Conclusions and Reflections**
 - What would you do differently next time?
 - What improvements would you make in your experimental procedure?
 - Did your results support your hypothesis?
 - What are your sources of error?

Science Fair Display

Your project display will communicate to others what your project is all about. The display should be a tri-fold (three-sided) and include a brief description of the various parts of your experiment. Adopt your display board to make it best for your project.

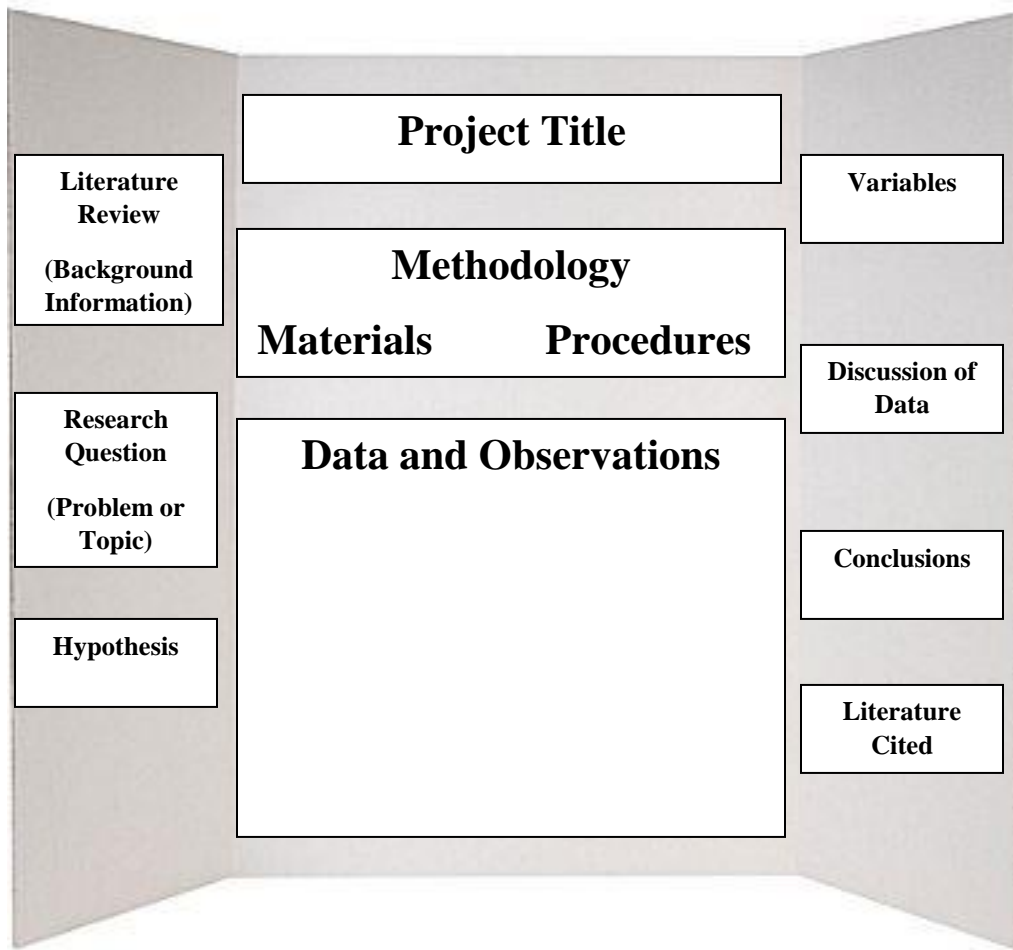
Helpful hints...

1. ***THE ABSTRACT SHOULD NOT BE ON YOUR BOARD***

2. Be organized. Make sure your display is logically presented and easy to read. A glance should allow anyone (particularly judges) to quickly locate your problem, hypothesis, variables, materials, procedure, data, discussion of data, and conclusions.
3. Eye-catching. Make your display stand out. Use neat, colorful headings, charts and graphs to present your project. Pay special attention to labeling graphs, charts, and tables. Each item must have a descriptive title. Anyone should be able to understand your visuals without further explanation.
4. Include photographs. Many projects involve elements that may not be safely exhibited at the fair, but are an important part of the project. Photographs should be taken of important parts/phases of the experiment to use in the display.
5. Follow RRSEF and GSEF guidelines for Photographs, Images, Charts:
 - Credits: You must cite the source of every photo, graph, chart or other image used, including those made by the student and those taken from the internet, journals and books. Citation examples: "All photographs by Jon Kim," or "Image from www.wherever.com." Put the info right by the photo/ item, or, if all images were taken or created by the exhibitor or are from the same source, one clearly visible credit line on the poster or on a "tent" on the table is sufficient.
 - Content: Photos or images on board must not be deemed insensitive, offensive or inappropriate (e.g., no surgery, necrosis or dis-section) by any member of the SRC, the Display and Safety Committee or GSEF staff. The decision made by any one of these groups is final.
 - Who can be in photos: Photos/videos of people other than the finalist are not allowed unless a signed photograph re-lease form is available at the project (see below).

Sample Science Fair Display

THE ABSTRACT SHOULD NOT BE ON YOUR BOARD



Categories for Science Fair Projects

You need to choose a category for your science project. The category should be based on your interests. Below is a suggested list of project categories and sub categories below based on the 2015 Georgia Science and Engineering Fair. To learn more about each category, visit

<https://student.societyforscience.org/intel-isef-categories-and-subcategories>

ANIMAL SCIENCES (AS)

- ◆ *Animal Behavior*
- ◆ *Development*
- ◆ *Ecology*
- ◆ *Genetics*
- ◆ *Nutrition and Growth*
- ◆ *Pathology*
- ◆ *Physiology*
- ◆ *Systematics and Evolution*
- ◆ *Other*

BEHAVIORAL & SOCIAL SCIENCES (BE)

- ◆ *Clinical & Developmental Psychology*
- ◆ *Cognitive Psychology*
- ◆ *Physiological Psychology*
- ◆ *Sociology*
- ◆ *Other*

BIOCHEMISTRY (BI)

- ◆ *General Biochemistry*
- ◆ *Medicinal Biochemistry*
- ◆ *Structural Biochemistry*
- ◆ *Other*

CELLULAR & MOLECULAR BIOLOGY (CB)

- ◆ *Cellular Biology*
- ◆ *Cellular and Molecular Genetics*
- ◆ *Immunology*
- ◆ *Molecular Biology*
- ◆ *Other*

CHEMISTRY (CH)

- ◆ *Analytical Chemistry*
- ◆ *Environmental Chemistry*
- ◆ *Inorganic Chemistry*
- ◆ *Materials Chemistry*
- ◆ *Organic Chemistry*
- ◆ *Physical Chemistry*
- ◆ *Other*

COMPUTER SCIENCE (CS)

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

EARTH & PLANETARY SCIENCE (EA)

- ◆ *Climatology, Weather*
- ◆ *Geochemistry, Mineralogy*
- ◆ *Historical Paleontology*
- ◆ *Geophysics*
- ◆ *Planetary Science*
- ◆ *Tectonics*
- ◆ *Other*

ENERGY & TRANSPORTATION (ET)

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

ENGINEERING: Electrical & Mechanical (EE)

- ◆ *Electrical Engineering, Computer Engineering, Controls*
- ◆ *Mechanical Engineering*
- ◆ *Robotics*
- ◆ *Thermodynamics, Solar*
- ◆ *Other*

ENGINEERING: Materials & Bioengineering (EN)

- ◆ *Bioengineering*
- ◆ *Civil Engineering, Construction Engineering*
- ◆ *Chemical Engineering*
- ◆ *Industrial Engineering, Processing*
- ◆ *Material Science*
- ◆ *Other*

ENVIRONMENTAL MANAGEMENT (EM)

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

ENVIRONMENTAL SCIENCES (EV)

- ◆ *Air Pollution and Air Quality*
- ◆ *Soil Contamination and Soil Quality*
- ◆ *Water Pollution and Water Quality*
- ◆ *Other*

MATHEMATICAL SCIENCES (MA)

- ◆ *Algebra*
- ◆ *Analysis*
- ◆ *Computer Mathematics*
- ◆ *Combinatorics, Graph Theory, and Game Theory*
- ◆ *Geometry and Topology*
- ◆ *Number Theory*
- ◆ *Probability and Statistics*
- ◆ *Other*

MEDICINE & HEALTH SCIENCES (ME)

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

MICROBIOLOGY (MI)

- ◆ *Antimicrobial agents*
- ◆ *Applied Microbiology*
- ◆ *Bacterial Microbiology*
- ◆ *Environmental Microbiology*
- ◆ *Microbial Genetics*
- ◆ *Virology*
- ◆ *Other*

PHYSICS AND ASTRONOMY (PH)

- ◆ *Atomic, Molecular, and Optical Physics*
- ◆ *Astronomy and Cosmology*
- ◆ *Biological Physics*
- ◆ *Condensed Matter and Materials*
- ◆ *Instrumentation and Electronics*
- ◆ *Magnetics, Electromagnetics and Plasmas*
- ◆ *Mechanics*
- ◆ *Nuclear and Particle Physics*
- ◆ *Optics, Lasers, Masers*
- ◆ *Theoretical Physics*
- ◆ *Other*

PLANT SCIENCES (PS)

- ◆ *Agronomy*
- ◆ *Development and Growth*
- ◆ *Ecology*
- ◆ *Genetics/Breeding*
- ◆ *Pathology*
- ◆ *Physiology*
- ◆ *Systematic*

Science Fair Project Report (Final Paper)

Title Page

- ❖ Original question/topic
- ❖ First and Last Names (No nicknames or preferred names)
- ❖ Class Period
- ❖ Due Date
- ❖ Teacher

Table of Contents (new page)

- ❖ A list of everything your paper includes with page numbers.
- ❖ Do not list the title page and table of contents on this page, begin with the abstract

Abstract (new page)

- ❖ May be one paragraph
- ❖ Maximum 250 words
 - Purpose for the experiment.
 - Brief summary of Methodology
 - Be sure to include all variables: control(s), independent variable, and dependent variable.
 - Brief summary of results and conclusions.

Introduction (new page)

- ❖ Should be at least four BRIEF paragraphs. (RRSEF student example on teacher webpage).
- ❖ Paragraph 1 – introduce your topic using key words from your title, establish the context of your paper.
- ❖ Paragraph 2 – state the purpose of the research study is about and the specific problem being experimented.
- ❖ Paragraph 3 – state your hypotheses or hypothesis
- ❖ Paragraph 4 – identify and explain your variables.
- ❖ Make sure you refer to some of your literature you reviewed.

Literature Review (new page)

- ❖ Paragraph format. (RRSEF student example on teacher webpage).
- ❖ Summarize the information from your sources.
- ❖ Information should be organized by topics or themes and flow smoothly.
- ❖ “How to Write a Scientific Literature Review” visit http://www.ehow.com/how_2337321_write-scientific-literature-review.html.

Methodology (new page)

- ❖ Paragraph form (RRSEF student example on teacher webpage)
- ❖ Paragraph 1 – materials
- ❖ Paragraph 2 – procedures
- ❖ Be specific and clear!

Data and Observations (new page)

- ❖ Required: at least one data table - a record observations
- ❖ Required: at least one graph - a picture representation of data (line, bar, circle)
- ❖ Tables and graphs must include – titles, labels, units of measurement, etc.
- ❖ You may include photographs with captions explaining exactly what is happening.

Analysis & Discussion of Data (new page)

- ❖ Paragraph form (RRSEF student example on teacher webpage)
- ❖ Explain what the data means in detail with supporting statements from graphs, data tables, pictures, etc.

Conclusions (new page)

- ❖ Paragraph form (RRSEF student example on teacher webpage)
- ❖ After analyzing the data, what does the researcher conclude?
- ❖ Does the researcher accept or reject the hypotheses or hypothesis? Explain why.
- ❖ What conditions may have affected the results and caused any experimental error?

Literature Cited (new page)

- ❖ A list of the resources used for your project.
- ❖ Must have a minimum of five different types of sources.
- ❖ At least three sources must be sources that are not from the internet!
- ❖ Use APA format. Below are a few websites to assist you with APA format:
 - <http://citationmachine.net/> - Son of Citation Machine
 - <http://owl.english.purdue.edu/owl/section/2/10> - Purdue Owl

Acknowledgements (new page)

- ❖ Thank all the people who assisted with the project!
- ❖ Try to get the signatures of the people you thanked!

Paperwork for Science Fair

ALL FORMS ARE DUE TO YOUR TEACHER BY Friday, September 19, 2014

- ☑ This year all forms must be typed and printed out! **IMAGES of the forms** have been included. You will need to access them, print them out, and then complete them.
- ☑ To access the forms digitally visit <https://student.societyforscience.org/forms>

Instructions for completing your science fair paperwork...

1. Fill in the following sections...
 - ✓ ***Checklist for Adult Sponsor (1)***
 - a. Student name (all members of team)
 - b. Project title
 - c. Required boxes
 - ✓ ***Student Checklist For (1A)***
 - a. Student/Team Leader
 - b. Grade
 - c. Parent Email
 - d. Parent Phone Number
 - e. Team member
 - f. Team member
 - g. Title of Project
 - h. Leave the start and end dates blank!
 - i. Check where you will be working on your experiment (check all that apply)
 - j. Name and address of each site
 - ✓ ***ISEF Research Plan(Same as Research Plan/Project Summary Instructions)***
 - The research plan must be **TYPED** using the format of the template provided. You may access the template on your teacher's webpage.
 - ✓ ***Approval Form (1B)***
 - a. Print your name
 - b. Sign your name
 - c. Print parent name
 - d. Parent sign's their name
 - ✓ ***Official Abstract***
 - Due with your FINAL PAPER when you turn it in to your teacher
2. ***Additional Forms*** must be completed for projects involving humans, vertebrate animals, or chemicals. You need to print these out, complete them, and include them with your paperwork.
 - a. Risk Assessment, form 3
 - b. Human Subjects, form 4
 - c. Vertebrate, form 5

Checklist for Adult Sponsor (1)

This completed form is required for ALL projects.

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

Student's Name(s): _____

Project Title: _____

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

Adult Sponsor's Printed Name

Signature

Date of Review

Phone

Email

Student Checklist (1A)
This form is required for ALL projects.

1. a. Student/Team Leader: _____ Grade: _____
Email: _____ Phone: _____
b. Team Member: _____ c. Team Member: _____
2. Title of Project:

3. School: _____ School Phone: _____
School Address: _____

4. Adult Sponsor: _____ Phone/Email: _____
5. Is this a continuation/progression from a previous year? Yes No
If Yes:
a) Attach the previous year's Abstract and Research Plan
b) Explain how this project is new and different from previous years on Continuation/Research Progression Form (7)
6. This year's laboratory experiment/data collection: (must be stated (mm/dd/yy))

Start Date: (mm/dd/yy) _____ End Date: (mm/dd/yy) _____
7. Where will you conduct your experimentation? (check all that apply)
 Research Institution School Field Home Other: _____
8. List name and address of all non-school work site(s):
Name: _____
Address: _____

Phone: _____
9. Complete a Research Plan/Project Summary following the Research Plan instructions and attach to this form.
10. An abstract is required for all projects after experimentation.

ISEF Research Plan for First name Last name | 2015

Name: Enter your name here.

Grade: Enter your grade here.

Category: Enter your proposed ISEF category here. More information available at http://www.societyforscience.org/isef/project_categories.

Project Title: Enter your proposed project title here. This cannot exceed 65 characters including spaces. Please put the character count after your title in parentheses.

Will this be an individual or team project? Team or Individual (select one and delete extra text)

Team Member Name and Grade: Type the name of your team members

Project Summary: Provide a brief summary of you're the actual work you did as a part of your research project. Detail how your methods evolved and were modified from the original plan. Also, briefly discuss the findings of your work.

A. Research Question or Problem being addressed.

State your research question or problem here. Include a rationale statement afterward that specifies why this project is meaningful. Please note that you must complete sentences throughout this document. Please refer to the Research Plan Instructions from ISEF (<http://www.societyforscience.org/document.doc?id=14>) for further clarification.

B. Hypothesis or Engineering Goals

Enter you hypotheses, sub hypothesis, and/or engineering goals here.

C. Detailed Description of Procedures

Experimental Design:

Enter your experimental design here. This should include information about your independent and dependent variables, the values of each variable, measurements, trials, constants, and controls.

Procedure:

Enter your procedure description here. This should include the identification of the important major sections of the procedure and a description of each section.

Data Analysis:

Describe the procedures you will use to analyze the data that answer your research question or hypothesis. This should include your graphs, descriptive, and inferential statistics.

D. Bibliography

List a minimum of five major references in APA format. At least two of these should be from published books and at least three of these should be journal articles on prior research in this field. At least one of your references must be related to the procedures you plan to use in this study.

Subject-Specific Guidelines- Delete sections that do not apply to your project but answer those that do completely

Enter any additional items that are required by ISEF for your research plan based on the elements it includes. If you have questions about one of these areas apply to you, please refer to the rules website for each.

1) **Human subjects research-** <http://www.societyforscience.org/page.aspx?pid=317>

Sample Selection

- Participants. Describe who will participate in your study (age range, gender, racial/ethnic composition). Identify any vulnerable populations (minors, pregnant women, prisoners, mentally disabled or economically disadvantaged).
- Recruitment. Where will you find your participants? How will they be invited to participate?
- Methods. What will participants be asked to do? Will you use any surveys, questionnaires or tests? What is the frequency and length of time involved for each subject?

Risk Assessment

- Risks. What are the risks or potential discomforts (physical, psychological, time involved, social, legal etc.) to participants? How will you minimize the risks?
- Benefits. List any benefits to society or each participant.
- Protection of Privacy. Will any identifiable information (e.g., names, telephone numbers, birthdates, email addresses) be collected? Will data be confidential or anonymous? If anonymous, describe how the data will be collected anonymously. If not anonymous, what procedures are in place for safeguarding confidentiality? Where will the data be stored? Who will have access to the data? What will you do with the data at the end of the study?
- Informed Consent Process. Describe how you will inform participants about the purpose of the study, what they will be asked to do, that their participation is voluntary and they have the right to stop at any time.

2) **Vertebrate animal research -** <http://www.societyforscience.org/page.aspx?pid=318>

- 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-** <http://www.societyforscience.org/page.aspx?pid=319>

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

4) **Hazardous chemicals, activities, and devices-**

<http://www.societyforscience.org/page.aspx?pid=320>

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

Approval Form (1B)

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

1. To Be Completed by Student and Parent

a. Student Acknowledgment:

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

Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include 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. 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 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 (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 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 and complies with all Intel ISEF Rules.

| | | |
|-----------------------------------|-----------|------------------|
| Regional SRC Chair's Printed Name | Signature | Date of Approval |
|-----------------------------------|-----------|------------------|

| | | |
|---|-----------|------------------|
| State/National SRC Chair's Printed Name (where applicable) | Signature | Date of Approval |
|---|-----------|------------------|

OFFICIAL ABSTRACT and CERTIFICATION

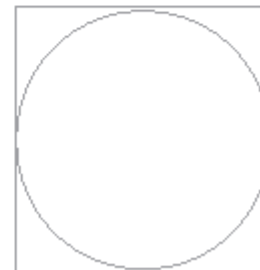


| |
|--|
| Type Title Here |
| Type Student Name |
| Type School Name, City and State, Country |
| Start Typing the Body of Your Abstract Here Beginning at the Left Margin |

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

- Animal Sciences
- Behavioral and Social Science
- Biochemistry
- Cellular & Molecular Biology
- Chemistry
- Computer Science
- Earth & Planetary Science
- Eng: Electrical & Mechanical
- Eng: Materials & Bioengineering
- Energy & Transportation
- Environmental Management
- Environmental Sciences
- Mathematical Sciences
- Medicine & Health
- Microbiology
- Plant Sciences
- Physics and Astronomy

1. As a part of this research project, the student directly handled, manipulated, or interacted with (check ALL that apply):
 - human potentially hazardous biological agents
 - vertebrate animals microorganisms rDNA tissue
2. This abstract describes only procedures performed by me/us, reflects my/our own independent research, and represents one year's work only Yes No
3. I/we worked or used equipment in a regulated research institution or industrial setting: Yes No
4. This project is a continuation of previous research. Yes No
5. My display board includes non-published photographs/visual depictions of humans (other than myself): Yes No
6. I/we hereby certify that the abstract and responses to the above statements are correct and properly reflect my/our own work. Yes No



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