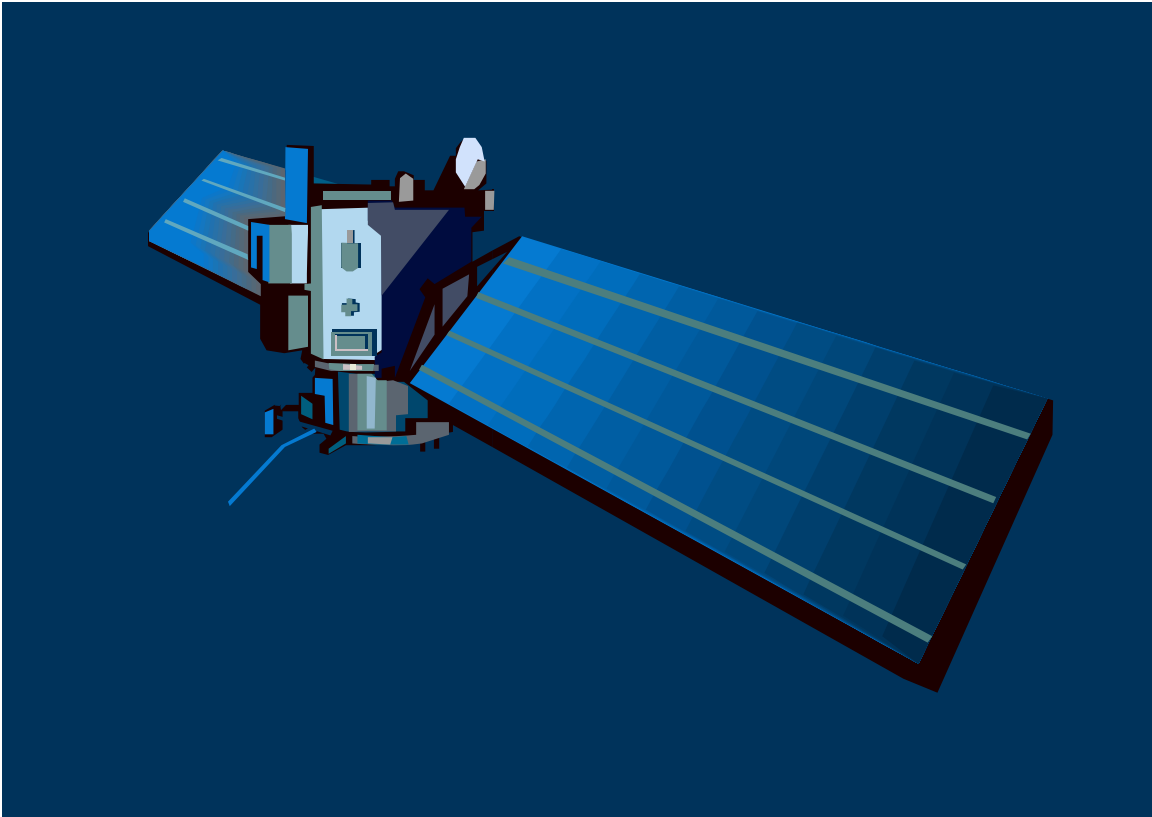




Middle School Science Fair Packet



Middle School SCIENCE FAIR

For Middle School, process must be modeled around BCSF. The following forms should be filled out at the correct times.

1. Form 1A – STUDENT CHECKLIST - should be completed before experiment. This would be in addition to writing the title/problem statement in their journal. Teacher must collect these and keep them until after the HAAS Science Fair. May discard all not chosen to advance to BCSF.
2. Form 1B – RESEARCH PLAN – Should be completed/due prior to doing the experiment (eg. After background information, procedures, materials are written). Should include research question, hypothesis, methods to be used (procedures and data analysis), and bibliography containing sources used to write the background information section. Needs to be type-written. *Need to follow form regarding instructions and applicable guidelines (may require more forms to be completed).*
3. ISEF ABSTRACT – should be completed and turned in on/with board. Must give students website address to form. It is a .pdf that can be typed on or written on if no computer access. Needs to be less than 250 words. Can provide example if needed.

Notebooks

Notebooks should be completed throughout the process, as done this year, with dates clearly printed on the top right of each page/section. Should be criteria for entry into HAAS Science Fair judging, because too difficult to get completed (or fixed) in time for BCSF.

Notebooks must be complete and present with students at the BCSF. They are not “required” for project registration, but the judges ask students if they have one and may ask questions about the notebooks. Students may also use notebooks to answer questions about their project if asked by the judges.

Boards

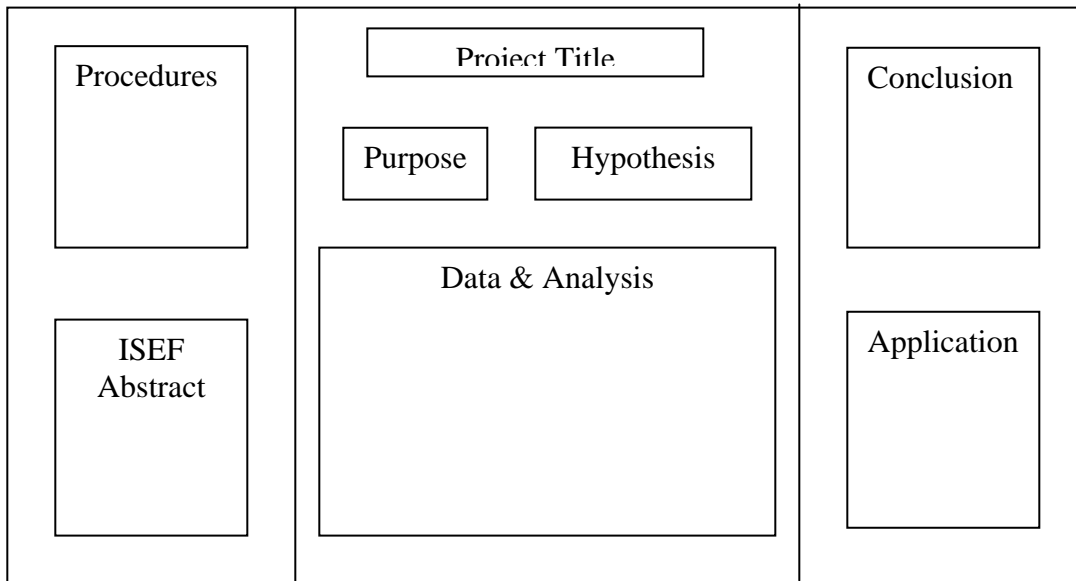
Nothing but paper should be on boards. At BCSF registration, all non-paper material is torn off and thrown out. Only exceptions are objects that come off the board and can be held in student’s pocket (e.g. small objects that can be held by Velcro). This is acceptable, but not preferred. BCSF officials prefer pictures of objects/materials instead.

Any photos must be credited (e.g. photo taken by.....) or they get ripped off the board at BCSF registration. Must also not use copyrighted pictures without permission. They will be torn off and thrown out at BCSF registration.

Only sections shown below should be on the board – IN CORRECT SPOTS. Sections not listed below (e.g. background info, acknowledgements, bibliography, etc.) will be torn off

Middle School SCIENCE FAIR

at BCSF registration and thrown out. If not in correct spots, cost students points during judging – it is as simple as following directions.



Boards must conform to BCSF checklist. This should be given to students prior to them putting their boards together, along with illustration of how the different sections should be oriented on the board (shown above).

Note: After speaking to many judges, realize that the most important part of the board is the data. Was told several times that they (e.g. the judges) are looking for data tables/charts/graphs/etc. that are organized and concise, with students that can explain them.

Middle School SCIENCE FAIR

DUE SEPTEMBER 9, 2011 (*assignment given to students on August 29, 2011*)

- ✓ Title
- ✓ Defining the problem
- ✓ Form 1A – Student Checklist

DUE OCTOBER 4, 2011 (*assignment given to students on September 13, 2011*)

- ✓ Background information
- ✓ Bibliography
- ✓ Hypothesis

DUE OCTOBER 25, 2011 (*assignment given to students on October 11, 2011*)

- ✓ Procedures
- ✓ Materials
- ✓ Form 1B - Research Plan (and any other forms/paperwork determined in guidelines)

DUE DECEMBER 5, 2011 (*assignment given to students on November 1, 2011*)

- ✓ Data
- ✓ Conclusion
- ✓ Application

DUE JANUARY 11, 2011 (*assignment given to students on December 12, 2011*)

- ✓ Notebook
- ✓ Display board
- ✓ ISEF Abstract

Middle School SCIENCE FAIR

TITLE

A title is a general or descriptive heading. An example of a creative title is “Purple Petunias,” or “Bullet Trains are Levitating”

DEFINING THE PROBLEM

The process of understanding the Scientific Method begins with observing or wondering about something in the world. It involves wondering how, why, and/or when something occurs. Discovery of things that are “new” usually begins with observation using the five senses: Sight, Sound, Smell, Touch, and Taste.

Key Words

Who What When Where Why How Explain Describe

Observation Questions

- What do I wonder about it?
- What do I want to find out?
- Is it possible to research this topic?

After a topic is chosen, the students need to express their problem as a specific, open-ended question, such as:

- “How does temperature affect the growth of mold on white bread?”
- “Does the temperature during a storm cause more waves?”

Rubric

Criterion	0 pts	5 pts	10 pts
Title is creative and clearly relates to the project			
Problem statement is in the form of a question			
Problem statement clearly states purpose of experiment			
Written using complete sentences			
Written with correct spelling, punctuation, etc.			

Total: _____

Middle School SCIENCE FAIR

BACKGROUND INFORMATION & BIBLIOGRAPHY

After a topic has been chosen, the next step is research. Research is the process of collecting information from experience, knowledgeable sources, and experiments.

To get started, think about these questions:

What do I know about my topic?

What additional information would help me?

How can I use different sources of information to gather the information I need?

You need to use several different sources when conducting research. Examples include:

Books Magazines Professional Journals Newspapers Internet Interviews

You need to use reliable resources. Not all web sites have accurate information. Make sure the information obtained can be verified in more than one source. You need to check the relevancy of the information, how qualified the author is, and whether or not the information could be biased. You need to use .gov .edu .org and other reliable sources; search engines such as Wikipedia are not acceptable. You need a minimum of 5 sources.

HYPOTHESIS

A hypothesis is a prediction or simply an educated guess about the solution to a problem. It is important to conduct research and consider prior knowledge before formulating a hypothesis. You will test your hypothesis by performing an experiment.

To form a hypothesis, you should focus on the problem and make an “If then” statement about the problem. **A hypothesis is a single statement about how two factors are related to each other.** For example, “If the temperature in a room is changed, then mold will grow faster on white bread” OR “If the barometric pressure drops in a tropical depression, then a hurricane will form.”

Once the hypothesis is written, you need to write several facts from your research that explains why you believe your hypothesis to be correct.

Rubric on next page →

Middle School SCIENCE FAIR

Rubric

Criterion	0 pts	2 pts	5 pts
Uses appropriate sources to research topic			
Prepares an outline of information (who, what, when, where, how) for background information			
Is written using students own words			
Is written using complete sentences			
Is written with correct spelling, punctuation, etc.			
Hypothesis is written in If/Then form			
Includes facts/information to support hypothesis			
Bibliography: Lists at least 5 sources			
Bibliography includes source descriptions (website address, book title, author, page #, publisher, publisher city, publish date)			
Is completed in notebook, other			

Total: _____

Middle School SCIENCE FAIR

PROCEDURES

A procedure is a way of doing something or getting something done. The procedures are written in complete sentences. They are listed and numbered. A procedure needs to be written clearly enough so that someone else can perform the same experiment. This is a step-by-step guide to doing the experiment. For example:

1. Fill one graduated cylinder with 75-ml of distilled water.
2. Weigh out .02 grams of Copper
3. Place .02 grams of Copper in one plastic cup.
4. Weigh out 1 gram of Sulfide.
5. Place 1 gram of chloride in the same plastic cup.
6. Add 75-ml of distilled water to the plastic cup.

MATERIALS

Materials are the substance or substances from which something is or can be made. Materials are tools or apparatus needed to perform a certain task.

Materials that are used during an experiment need to be listed. The amounts of the materials need to also be listed. Below is an example of a materials list:

12 300-ml Plastic cups at room temperature	1 Scale
1 250-ml graduated cylinder	5 Grams Copper (Cu)
1 stopwatch	15 Grams Sulfide (S ₂)
30 small paper plates	1,000-ml distilled water
1 Triple Beam Balance	1 Data table

FORM 1B - RESEARCH PLAN

Follow guidelines on form and request appropriate documents from teacher or Science Fair Coordinator.

Rubric

Criterion	0pts	5 pts	10 pts
Procedure is clear and precise (e.g. steps are in order, easy to follow, etc.)			
Procedure is written in complete sentences with proper spelling/grammar			
All materials are clearly listed			
Amounts or quantity used are included in list of materials			
<i>Completed</i> Research Plan submitted (e.g. type written, following guidelines) with other applicable forms indicated on Form 1B			

Total: _____

Middle School SCIENCE FAIR

DATA

Data is what is observed. Data is listed in the form of a table. The data is then used to make charts or graphs, so that you can clearly see the results from the data.

The student needs to record their data collected through measurements or observations in a clearly labeled data table. The student will use the data table to construct the appropriate type of graph to provide a pictorial representation of what happened during the experiment.

The student will write and explain the variables of the experiment. A variable is anything that affects your topic and can or cannot be changed in your experiment. There are three types of variables: dependent, independent, and control. A dependent variable is the change that happens in your experiment or what you are measuring. The independent variable is the one thing that that you can change in your experiment to figure out what impact it has on the topic you are studying. The control variable is the variable that is not changed; it shows what happens when the independent variable is not applied.

An easy way to identify the variables in an experiment is to fill in the blanks of the following sentence,

The ____ depends on _____.

For example, in an experiment testing the effects of temperature on the growth of bread mold would be.....

The growth of mold depends on the temperature of a room.

The growth of mold is the dependent variable and the temperature is the independent variable. You will be changing the temperature of the room so the growth of the mold will be affected. A control would be a room that is always at the same constant set temperature with no changes.

Continued on next page →

Middle School SCIENCE FAIR

CONCLUSION

The conclusion is the full explanation of what your project was and what it showed you. A conclusion will answer your problem and your hypothesis, based on the data collected during your experiment. You will explain any problems and how you would correct them in the future. You will need to explain what you would do differently if you did the experiment again. If your results are different than you expected you need to discuss this. You also need to discuss any other questions you have now after doing the experiment.

APPLICATION

The application of a project is another way of saying how might the result of this project be used. This should be a short paragraph that explains how the data/information that was found in the experiment could be used.

Rubric

Criterion	0 pts	2 pts	5 pts
Data recorded using charts, graphs, tables, photos, etc.			
Charts, graphs, tables, etc. are organized and easy to read			
Identified dependent, independent, and control variables			
Conclusion states if hypothesis was correct/incorrect with explanation			
Conclusion includes analysis of data (what was found, why)			
Conclusion includes limitations (problems) of experiment			
Conclusion includes recommendations for future experiments			
Application states how information/data could be used			
Are written using complete sentences			
Are written with correct spelling, punctuation, etc.			

Total: _____

Middle School SCIENCE FAIR

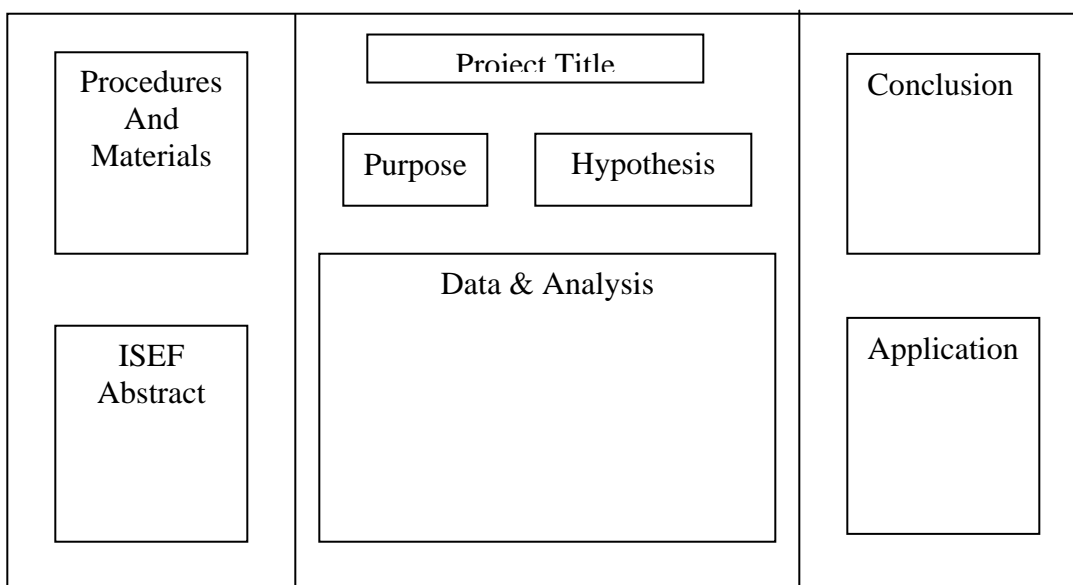
NOTEBOOK

The notebook is a journal that the student must complete throughout the entire process of doing his/her science fair project. Below is a list of guidelines that should be followed while completing the notebook.

- The first two pages should be left blank to leave room for a table of contents. The table of contents should be created as the project is done and new sections are added.
- All pages should be numbered.
- Dates should be written in the upper right portion of the page (per section).
- Information should be entered into the notebook using complete sentences, correct punctuation, spelling, etc. as instructed by their teacher.

SCIENCE FAIR BOARD

Boards should be set-up or organized as shown below.



Board must conform to BCSF checklist (given to students by teacher).

Nothing but paper should be on boards. BCSF officials prefer pictures of objects/materials instead of attaching object/materials to the boards.

Any photos must be credited (e.g. photo taken by.....) and copyrighted pictures are not permitted without permission.

Middle School SCIENCE FAIR

ISEF ABSTRACT

Form may be accessed at <http://www.floridassef.net/Studentforms.htm> by clicking on the selection that says SSEF Florida Abstract Form (#14). Form is a .pdf file that may be typed on. Students may fill the form out online and print (preferred) or print the form and complete by hand. Students are only to complete abstract portion. All check boxes will be completed by Science Fair Coordinator upon registration for the Science Fair.

The abstract is a simply a brief summary of the experiment. It should summarize the purpose of the experiment, the procedures used, the results, and conclusions. It should not exceed 250 words.

Rubric

Criterion	0 pts	2 pts	5 pts
Notebook includes all sections/assignments (including table of contents)			
Notebook pages are numbered and dates are written for each section			
Board is the appropriate size			
Board is set up as instructed (using the proper format)			
Data section is clear and well organized (includes tables, graphs, etc.)			
Student followed checklist/guidelines when setting up board			
ISEF abstract is completed (includes brief summary of purpose, procedures and analysis, results, and conclusions; less than 250 words)			
ISEF abstract is signed and dated			
Are written using complete sentences			
Are written with correct spelling, punctuation, etc.			

Total: _____

Student Checklist (1A)

This form is required for ALL projects.

1) a. Student/Team Leader: _____ Grade: _____

Email: _____ Phone: _____

b. Team Member: _____ c. Team Member: _____

2) Title of Project: _____

3) School: _____ School Phone: _____

School Address: _____

4) Adult Sponsor: _____ Phone/Email: _____

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

If Yes:

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

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

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

Start Date: _____ End Date: _____

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

Research Institution School Field Home Other: _____

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

Name: _____

Address: _____

Phone: _____

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

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

Research Plan Instructions

A complete research plan is required and must accompany Checklist for Student (1A)

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

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

A. Question or Problem being addressed

B. Goals/Expected Outcomes/Hypotheses

C. Description in detail of method or procedures (The following are important and key items that should be included when formulating ANY AND ALL research plans.)

- **Procedures:** Detail all procedures and experimental design to be used for data collection
- **Data Analysis:** Describe the procedures you will use to analyze the data that answer research question or hypothesis

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

- Choose one style and use it consistently to reference the literature used in the research plan
- Guidelines can be found in the Student Handbook

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

1. Human participants research:

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

2. Vertebrate animal research:

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

3. Potentially Hazardous Biological Agents:

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

4. Hazardous Chemicals, Activities & Devices:

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

Approval Form (1B)

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

1) To Be Completed by Student and Parent

a) Student Acknowledgment:

- I understand the risks and possible dangers to me of the proposed research plan.
- I have read the Intel ISEF Rules and Guidelines and will adhere to all International Rules when conducting 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
(Must be prior to experimentation.)

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

Parent/Guardian's Printed Name

Signature

Date of Approval
(Must be prior to experimentation.)

2) To be completed by the Fair SRC

(Required for projects requiring prior SRC/IRB APPROVAL. Sign 2a or 2b as appropriate.)

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

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

SRC/IRB Chair's Printed Name

Signature

Date of Approval
(Must be prior to experimentation.)

OR

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

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

SRC Chair's Printed Name

Signature

Date of Approval

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

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

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

Regional SRC Chair's Printed Name

Signature

Date of Approval

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

Signature

Date of Approval

Regulated Research Institutional/Industrial Setting Form (1C)

This form must be completed AFTER experimentation by the adult supervising the student research conducted in a regulated research institution, industrial setting or any work site other than home, school or field.

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

Student's Name(s) _____

Title of Project _____

To be completed by the Supervising Adult in the Setting (NOT the Student(s)) after experimentation:
(Responses must remain on the form as it is required to be displayed at student's project booth.)

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

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

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

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

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