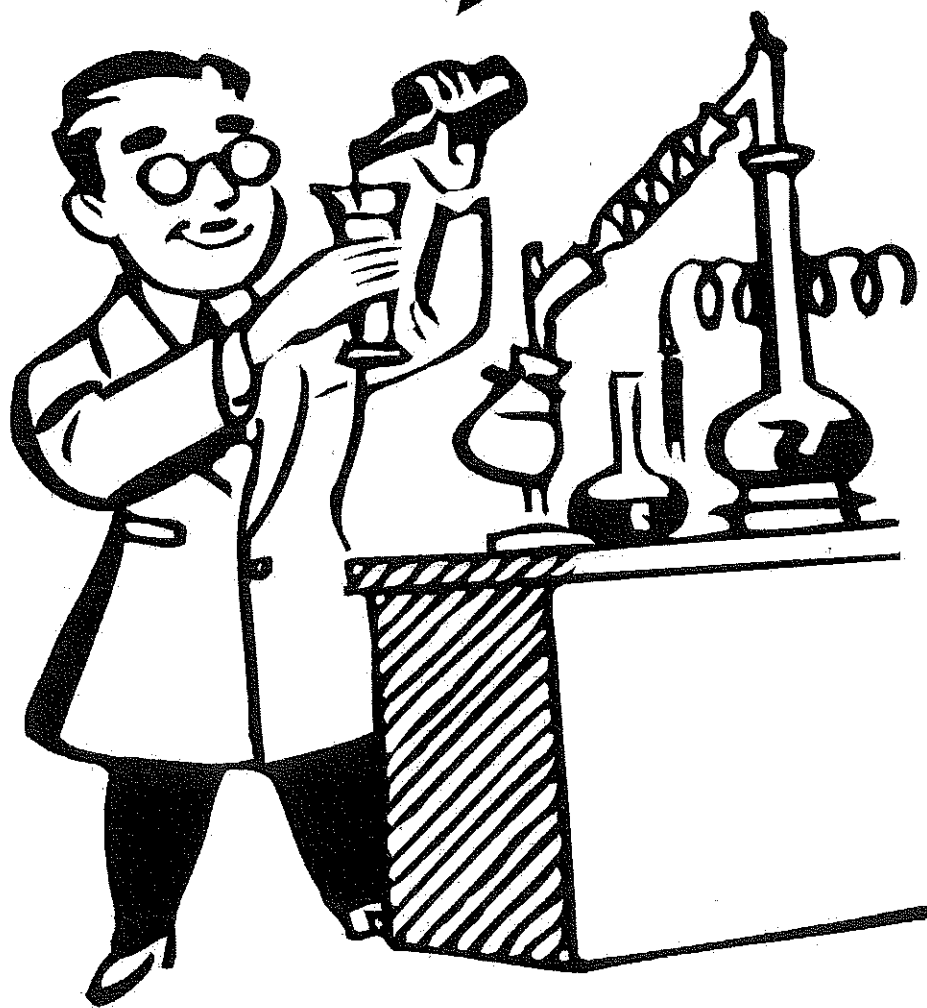


Science
Fair
2019



Middle School

2018-2019

A HOW-TO GUIDE TO YOUR SCIENCE FAIR PROJECT



Introduction:

The purpose of this booklet is to provide information on how to complete a science fair project. Ideas are given on how to choose, develop, and display a project, as well as how to prepare for judging. Although a lot of hard work goes into preparing a project, remember that the purpose of a project, which is a reflection of you and your interests, is to provide you with an enjoyable learning experience. So above all, enjoy working and doing science, because **SCIENCE IS FUN!**

Steps to a Successful Project:

1. Understand the rules -

Before you start your project, familiarize yourself with the rules. Read the list of some of the important things you need to know, checking off each item as you read. Ask your teacher to explain any that you do not understand. Refer back to this list of rules as you are working on your project and after you have finished it to make sure you have followed them. The list of rules are at the end of this booklet.

2. Pick your Topic -

Get an idea of what you want to explore! Choose a topic for your project, you could look through magazines, books, textbooks, etc. that deal with the type of science that interest you. Ideas might come from hobbies or problems you see that need solutions. List the categories or ideas that you have selected and choose a specific topic



A HOW-TO GUIDE TO YOUR SCIENCE FAIR PROJECT



7. Conduct your Experiment & Take Photographs -

During experimentation, keep detailed notes of each and every step, measurement, and observation. Keep a research journal and give dates and times when possible. Try to take photographs as you are doing your experiment and the results of the experiment. Remember to change only one variable at a time when experimenting, and make sure to do a control experiment in which none of the variables are changed. Make sure you include at least five or more test subjects in both the control group and experimental groups. Note any unusual changes you had to make in your procedure and that may show up in the results.

8. Examine your Results -

When you complete your experiments, examine and organize your findings. Use a chart, graph, table, etc. to show your results. Did your experiment give you the expected results and why or why not? Was your experiment performed with the exact same steps each time? Are there other explanations that you had not considered or observed? Remember that understanding unusual results is NOT a scientific failure, but still is valuable information to be reported.



9. Draw Conclusions -

Answer the following questions: Which variables are important? Did you collect enough data? Do you need to conduct more experimentation? Did you support your hypothesis? If your results do not, what may have happened? Remember an experiment is done to prove or disprove an hypothesis.



A HOW-TO GUIDE TO YOUR SCIENCE FAIR PROJECT

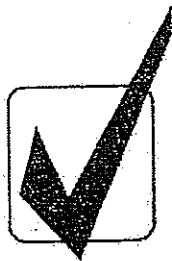


12. Prepare for Judging -

Your project will be judged using a point system based on six areas. These areas are scientific thought, creativity ability, understanding, clarity, dramatic value, and technical skill.

The oral presentation is an important part of the judging process. During your presentation, you should explain to the judges: why you chose your topic and question, how and where you gathered your information, how you tested your hypothesis and what observations you made, and what conclusions you reached. You may want to write note cards or refer to parts of your display in order to plan what you are going to talk about. Be well rehearsed and know what you are going to say - do NOT read it. Your presentation should be only be 3-5 minutes. Practice in front of your family or friends. Keep in mind that the judges are looking for the student who has learned from the experience of completing a science fair project.

Although it is natural to be a little nervous about the judging, remember the judges are not there to trick or embarrass you. They are interested in you and in what you have discovered through your science project. So be pleasant, courteous, and enjoy yourself. Above all, show them you are proud of the work you have accomplished!



A HOW-TO GUIDE TO YOUR SCIENCE FAIR PROJECT

Bibliography

Please remember to keep a record of all resources as you research your topic and write your report. Your bibliography should be organized with the following information about each source then listed in alphabetical order by the first word of each entry.

Information For A Bibliography

Book

Author, Title, Place of Printing: Publishing Co., Date, Pages

EXAMPLE:

Shippen, Katherine B., A Bridle for Pegasus, New York: Biking Press,
1991, pp. 28-42

Encyclopedia

Author, "Title of Article", Name of Encyclopedia, Year, Volume, Page

EXAMPLE:

Piccard, Don, "Balloon," The World Book Encyclopedia, 1994,
Vol. 2, pp. 39-44

Magazines

Author, "Title of Article," Name of Magazine, Volume: Number, Pages, Date

EXAMPLE:

Lewis, C., "the Navy Unveils Rockets," Aviation World, Vol. 68: No. 6,
pp.; 49-51, November 3, 1958

Internet

Author (if known), "Title of Article or Webpage," Web Address, Date Documented

EXAMPLE:

_____, "NASA Space Shuttle Launches," <http://science.ksc.nasa.gov/shuttle/missions/missions.html>, September 11, 2000

Media

Program Title, Type of Media (be specific as possible), Date

EXAMPLE:

60 Minutes, Television, Cable GS Communications Channel 7,
September 10, 2000

Interviews

Name of Person, Position, Company, Location, Date Interviewed

EXAMPLE:

John C. Jones, Lawyer, Jones & Sons, Martinsburg, WV, August 15, 2000

A HOW-TO GUIDE TO YOUR SCIENCE FAIR PROJECT

Middle School Display and Safety Regulations

Displayed only during judging interviews:

To be removed and placed under the table in a sturdy, opaque, covered container before and after the interview!

1. Containers (non-glass) filled with water - no baggies!
2. Project with unshielded belts, pulley, chains, and moving parts with tension or pinch points may be displayed but CANNOT be operated.
3. Any apparatus producing temperatures that will cause physical burns must be adequately insulated and stored under the table after the interview.
4. Wood samples and tree cross sections (sawdust, shavings and wood chips must be in sealed non-glass containers - no baggies).
5. Man-made crystals in sealed, non-glass containers - no baggies.
6. Particulates collected from the atmosphere must be in sealed non-glass containers - no baggies or plastic wrap.

Unacceptable for Display - NOT ALLOWED AT THE FAIR

1. No liquids of any kind.
2. No Human or animal food substances.
3. Insect collections which are not sealed
4. Taxidermy specimens or parts.
5. Photographs or other visual presentations depicting animals (or humans) in other than normal conditions such as surgical techniques, dissection necropsies of other lab techniques.
6. No organisms (vertebrate or invertebrate animals), fungi, any type of cultured growth, spoiled food, or molds.
7. No chemicals including caustics, acids, and pH indicators.
8. Human/animal parts except teeth, hair, nails, dried animal bones and sealed slides.
9. Sharp items as syringes, needles, pipettes, etc.
10. Poisons, drugs, controlled substances or medicines including non-prescription.
11. Dry ice or other sublimating substances.
12. Flames or highly flammable display materials
13. Tanks that have contained combustible liquids or gases.
14. Batteries with open top cells.
15. Awards, medals, business cards, flags, etc.
16. No plants (alive or dried) or plant parts - use photos or plastic.
17. No soil samples of any kind except rocks or minerals gravel size or larger and clean dry sand.
18. No glass of any kind including slides except lightbulbs and non-mercury thermometers enclosed in non-breakable housings.

Berkeley County Schools Science Fair Project Judging Form

Project Title _____

Project Category _____ Project Number _____

Criteria:

Scientific Thought (30 Points) _____

- Is the problem concisely stated?
- Are the procedures appropriate and thorough?
- Is the information collected complete?
- Are the conclusions reached accurate?
- Comments:

Creativity: (30 Points) _____

- How unique is the project?
- Is it significant and unusual for the age of the student?
- Does the project show ideas arrived by the student?
- Comments:

Understanding: (10 Points) _____

- What did the student learn about the project?
- Did the student use appropriate literature for research?
- Can the student answer questions about the topic?
- Comments:

Clarity: (10 Points) _____

- Are the problems, procedures, data, and conclusions presented logically?
- Can the objectives be understood by non-scientists?
- Are the written materials clear and articulate?
- Comments:

Dramatic Value: (10 Points) _____

- How well did the student present the project?
- Is the display visually appealing?
- Is the proper emphasis given to important ideas?
- Comment:

Technical Skill (10 Points) _____

- Was the majority the work done by the student?
- Does the written material show attention to grammar and spelling?
- Is the project well-constructed?
- Comments:

Total Points _____
(based upon 100 points)

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/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:

<input type="checkbox"/> Humans	Potentially Hazardous Biological Agents
<input type="checkbox"/> Vertebrate Animals	<input type="checkbox"/> Microorganisms <input type="checkbox"/> rDNA <input type="checkbox"/> Tissues
5. Items to be completed for ALL PROJECTS

<input type="checkbox"/> Adult Sponsor Checklist (1)	<input type="checkbox"/> Research Plan/Project Summary
<input type="checkbox"/> Student Checklist (1A)	<input type="checkbox"/> Approval Form (1B)
<input type="checkbox"/> Regulated Research Institutional/Industrial Setting Form (1C) (when applicable; after completed experiment)	
<input type="checkbox"/> 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, archae 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

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. Does this project need SRC/IRB/IACUC or other pre-approval? Yes No Tentative start date: _____

6. Is this a continuation/progression from a previous year? Yes No

If Yes:

a. Attach the previous year's Abstract **and** Research Plan/Project Summary

b. Explain how this project is new and different from previous years on

Continuation/Research Progression Form (7)

7. This year's laboratory experiment/data collection:

Actual Start Date: (mm/dd/yy)

End Date: (mm/dd/yy)

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

Research Institution School Field Home Other: _____

9. List name and address of all non-home and non-school work site(s):

Name: _____

Address: _____

Phone/
email _____

10. Complete a Research Plan/Project Summary following the Research Plan/Project Summary instructions and attach to this form.

11. An abstract is required for all projects after experimentation.

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.)

Student's Name(s)	Title of Project
Adult Sponsor	Phone/Email
Must be completed by Student Researcher(s) in collaboration with the Adult Sponsor/Designated Supervisor/Qualified Scientist:	
1. <input type="checkbox"/> 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. <input type="checkbox"/> I have attached any surveys or questionnaires I will be using in my project or other documents provided to human participants. <input type="checkbox"/> Any published Instrument(s) used was /were legally obtained.	
3. <input type="checkbox"/> I have attached an informed consent that I would use if required by the IRB.	
4. <input type="checkbox"/> Yes <input type="checkbox"/> 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): | <input type="checkbox"/> Minimal Risk | <input type="checkbox"/> More than Minimal Risk |
| 2. Qualified Scientist (QS) Required (Form 2): | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Designated Supervisor (DS) Required (Form 3): | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Written Minor Assent required for minor participants: | | |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Not applicable (No minors in this study) |
| 5. Written Parental Permission required for minor participants: | | |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Not applicable (No minors in this study) |
| 6. Written Informed Consent required for participants 18 years or older: | | |
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> 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.

Printed Name	Degree/Professional License
Signature	Date of Approval (Must be prior to experimentation.) (mm/dd/yy)
Educator	
Printed Name	Degree
Signature	Date of Approval (Must be prior to experimentation.) (mm/dd/yy)
School Administrator	
Printed Name	Degree/Professional License
Signature	Date of Approval (Must be prior to experimentation.) (mm/dd/yy)

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

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)
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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: _____

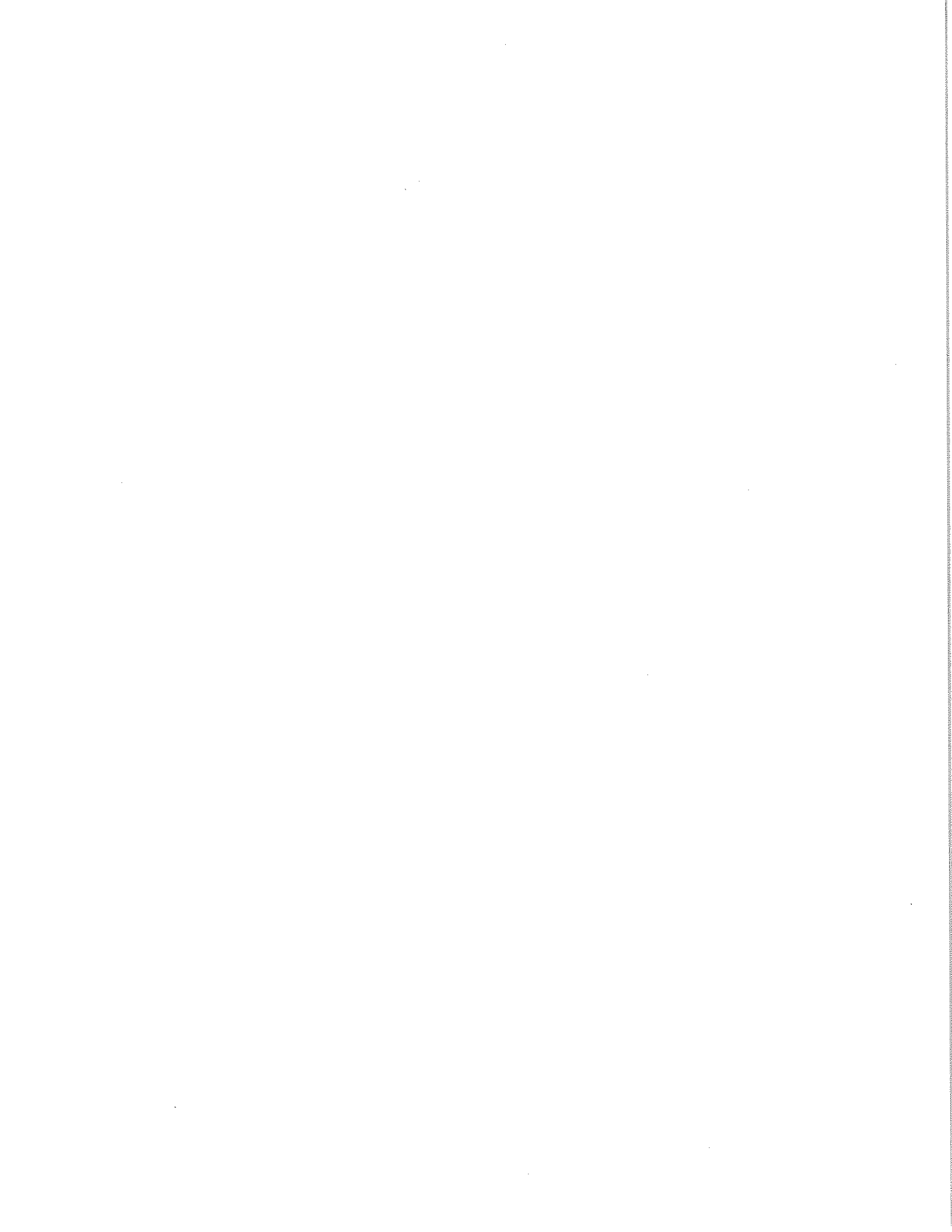
Signature: _____

Parental/Guardian Permission (if applicable)

Date Reviewed & Signed: _____
(mm/dd/yy)

Parent/Guardian Printed Name: _____

Signature: _____



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.

Student's Name(s) _____

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.

Components	Current Research Project (2018-2019)	Previous Research Project Year:
1. Title		
2. Change in goal/ purpose/objective		
3. Changes in methodology		
4. Variable studied		
5. Additional changes		

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.

 Student's Printed Name(s)

 Signature

 Date of Signature (mm/dd/yy)

OFFICIAL ABSTRACT 2019

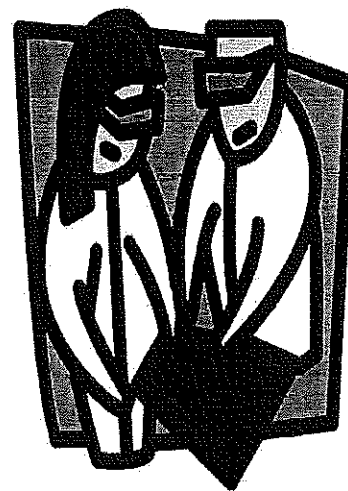
Category

Pick one only—mark an "X" in space in front of the category

- 1. Animal Sciences
- 2. Behavioral & Social Sci.
- 3. Biochemistry
- 4. Biomedical & Health Sci.
- 5. Cell & Molecular Biology
- 6. Chemistry
- 7. Computational Bio. & Bioinform.
- 8. Earth Science & Environmtl Sci.
- 9. Embedded Systems
- 10. Energy
- 11. Engineering
- 12. Material Science
- 13. Mathematics
- 14. Microbiology
- 15. Physics & Astronomy
- 16. Plant Sciences
- 17. Robotics & Intelligent Machines
- 18. Systems Software

Title:

Abstract:



1. As a part of this research project, the student directly handled, manipulated, or interacted with (check ALL that apply):

- human subjects
- vertebrate animals
- potentially hazardous biological agents
- 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
- 3. I/we worked or used equipment in a regulated research institution or industrial setting:
- 4. This project is a continuation of previous research.
- 5. My display board includes non-published photographs/visual depictions of humans (other than myself):
- 6. I/we hereby certify that the abstract and responses to the above statements are correct and properly reflect my/our own work.

(Student Signature(s))

APPLICATION FOR ENTRY OF SCIENTIFIC EXHIBIT
BERKELEY COUNTY SCIENCE FAIR
 February 15-16, 2019

Student's Name _____ School _____
 Last First
 Home Address _____ Home Phone _____
 _____ Grade _____

Title of Project _____

Categories - Check One

- | | |
|--|--|
| <input type="checkbox"/> 1. Animal Sciences | <input type="checkbox"/> 10. Energy |
| <input type="checkbox"/> 2. Behavioral & Social Sci. | <input type="checkbox"/> 11. Engineering |
| <input type="checkbox"/> 3. Biochemistry | <input type="checkbox"/> 12. Material Science |
| <input type="checkbox"/> 4. Biomedical & Health Sciences | <input type="checkbox"/> 13. Mathematics |
| <input type="checkbox"/> 5. Cell & Molecular Biology | <input type="checkbox"/> 14. Microbiology |
| <input type="checkbox"/> 6. Chemistry | <input type="checkbox"/> 15. Physics & Astronomy |
| <input type="checkbox"/> 7. Computational Biology & Bioinformatics | <input type="checkbox"/> 16. Plant Sciences |
| <input type="checkbox"/> 8. Earth Science & Environmental Sciences | <input type="checkbox"/> 17. Robotics & Intelligent Machines |
| <input type="checkbox"/> 9. Embedded Systems | <input type="checkbox"/> 18. Systems Software |

Note: Teams will be integrated into 1-18

PLEASE ANSWER THE FOLLOWING QUESTIONS

1. Have you reviewed the Display and Safety Regulations required by ISEF rules? YES NO
 2. Are all the following forms attached to this application?

Elementary

Abstract

Junior

- Abstract
 Checklist 1
 Research Plan 1A2
 Approval Form 1B

Senior

- Abstract
 Checklist 1
 Research Plan 1A2
 Approval Form 1B

3. Is your project larger than 76 cm deep, 122 cm wide, or 274 cm high including table? This is max size.
 YES NO
 4. Does your display use photographs? YES NO
 If yes, no photographs of animals in other than normal conditions; no dissection photographs nor laboratory techniques can be shown; no faces of individuals.
 5. Does your display require an electrical supply? YES NO
 If yes, you must supply your own grounded extension cord (minimum of 9 feet).

CERTIFICATION

I hereby apply for space in the Berkeley County Science Fair with full intention of entering an exhibit. I agree to abide by the Display and Safety Rules and Regulations, which I have read. I certify that the project is essentially my own work.

 Student's Signature

I certify that to the best of my knowledge this project was essentially the work of the student named above, and I give my approval for it to be entered in Science Fair Competition.

 Adult Sponsor's Signature (Teacher)

 Parent/Guardian's Signature

Research Plan (1A2)

REQUIRED for ALL Projects Before Experimentation
A complete research plan must accompany Checklist for Student (1A)

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

A. Question being addressed

B. Hypothesis/Problem/Engineering Goals

C. Description in detail of method or procedures

Procedures:

Data Analysis:

D. Bibliography: List at least five (5) major references

1.

2.

3.

4.

5.