

SCIENCE FAIR HANDBOOK

Alma High School

2019-2020



ISEF 2020

Anaheim, California

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Science Fair Handbook

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Getting Started With Science Fair

1. Selecting a topic

Selecting a topic is often the most difficult part of the science fair process. Topic ideas can come from a variety of places such as the internet, articles, tv shows, teachers, parents, friends, etc. The idea is to pick a topic that interests you and that you have the ability to see through to the end. It does no good to have a grand idea but not have the resources to finish the project. You want the project to be completely your own work, and be something you can be proud of. You will get out of science fair exactly what you put into it.

2. Research your Topic

After selecting your topic, learn everything there is to know about the subject. Look for good reliable sources such as books, peer reviewed research articles, periodicals, journals, etc. Many of these sources can be found on the internet. You will need to cite as least five sources.

3. Make a Plan

Once you consider yourself an “expert” about your topic, make a plan as to how you will conduct your experiment. Your plan can be written in your data book and contain the following:

- The purpose of your experiment “To what extent does ____ affect _____?”
- The variables in your experiment that you will change and the ones you will keep constant.
- Your hypothesis or what you think the outcome of the experiment will be. Do not use first person in your writing.
- A list of all materials needed to do your experiment.
- A detailed procedure outlining how you will conduct the experimentation

4. Complete and Turn in your Science Fair Paperwork. Forms include the following and can be found on the ISEF/forms website [Forms link](#):

- Checklist for Adult Sponsor (1)
- Student Checklist (1A)
- Research Plan (follow guidelines)
- Approval Form (1B)
- If you are doing a project with humans, bacteria, tissues, body fluids, or vertebrate animals, you will have to complete other forms as well.

***Turn in a hardcopy of all forms listed above, the research plan will also have to be

turned in on Google classroom so that your teacher will have a digital copy of your project.

5. Conduct the Experiment

The next step is to follow the plan that you have written. While conducting the experiments make sure you keep detailed notes on everything you observe in your data book. Try to get numerical data if possible. Numerical data can be graphed and analyzed using statistical analysis.

6. Analyze Your Results/Form Conclusions

Once you are finished with the experiment, look through your notes and analyze your data. Ask yourself, what happened?, did the results agree with your hypothesis?, and so on. Use graphs and statistics to represent the data and help you analyze it. Write a conclusion to summarize your findings.

7. Write a Science Fair Paper

Write a detailed report about your project. Follow the guidelines found in this handbook.

8. Make your Display Board

The display board is crucial to your success at the fair because it tells about your project. The display must be neat and well organized. It should include the problem, hypothesis, materials, procedure, data including graphs and pictures, and conclusion. You should have 2 copies of your paper and your data book in front of your display on science fair day. See the Science Fair Board page.

9. Rehearse Your Presentation

When you make your presentation to the judges, it is important that you are prepared and know what you are going to say before you have to say it. Being prepared helps you feel less nervous and have more confidence.

10. Do your BEST!!

ISEF Categories

Animal Sciences

Behavioral and Social Sciences

Biochemistry

Cellular and Molecular Biology

Chemistry

Computer Science

Earth and Planetary Science

Engineering: Electrical and Mechanical

Engineering: Materials and Bioengineering

Energy and Transportation

Environmental Management

Environmental Sciences

Mathematical Sciences

Medicine and Health Sciences

Microbiology

Physics and Astronomy

Plant Sciences

Team

Setting Up Your Data Book

To get started.....Number your data book (composition notebook) in the upper right hand corner pages 1-27. Then write the appropriate heading on the correct page.

Title.....	page 1
Table of Contents.....	page 2
Purpose Statement.....	page 3
Hypothesis.....	page 4
5 sources and notes.....	pages 5-10
Materials	page 11
Procedure.....	pages 12-13
Data	pages 14-20
Conclusion.....	pages 21-25
Future Studies.....	page 26
Acknowledgements.....	page 27

Science Fair Paper

The paper is worth 100 points. Proper usage of the English language and correct spelling must be observed at all times. Third person, past tense should be observed in writing the science paper. Whenever possible, avoid direct reference to yourself. If you find it necessary to refer to yourself directly, you may refer to yourself as “the researcher”.

The science paper should be typed. It should be double spaced and 12 font. The abstract is the exception. It will be single spaced and a maximum of 250 words.

General Outline of the Paper:

1. Title Page- Include the title of your project, your name, date, and teacher’s name.
2. Abstract-A 250 word summary of the project which included the purpose, procedure, data and conclusion. This part will have to be written last because it is a summary of your project. Also, you will put your abstract on the official abstract form [Abstract Form](#).
Hint: Type your abstract in your paper so you will have a saved copy, then copy and paste your abstract on to the form. You will have to be in Internet Explorer to copy and paste.
3. Table of Contents-All the headings in the table of contents should correspond exactly in wording with the headings as they appear in the texts of the paper. Provide a page number for each section.
4. Introduction-This is a short paragraph that introduces your project. This is where you “grab” the reader and emphasize the importance and real world application of your project. Therefore you should discuss the main purpose of the experiment, why you chose the topic, and how it applies to the real world. It should provide a smooth transition into your paper.
5. Purpose or Problem-This statement should be concise, brief and very carefully composed. It should be in the following format: To what extent does _____ affect _____?
6. Hypothesis-Educated guess of the outcome of the experiment. Compose a brief statement describing how you think the independent variable will affect the dependent variable. Do not say “I think”. Try not to refer to yourself at all in this statement. The experiment was designed to test this hypothesis, and you should either accept or reject it on the basis of the data collected during the experiment in the conclusion.

7. Review of Literature-This section should be 2 to 5 pages in length. It is a summary of the important information found in your sources that you have cited in your research plan. Remember to paraphrase the information into your own words. No one wants to be guilty of plagiarism. It is important to use parenthetical citations using APA or MLA format to cite your sources. Example: APA requires author's last name and year of publication (Miller, 2010)
8. Materials-List of materials used in your experiment
9. Procedure- detailed, step by step directions on how you completed your experiment. The key to writing this section is that after reading it, there will be enough detail to allow the experiment to be repeated by others. All measurements need to be made in metric units.
10. Data-Section that includes all of the data recorded during the experiment. Data should be organized in tables and graphs. Data should be objectively reviewed.
11. Conclusion-This is a very important section of your paper. It is a summary paragraph that includes the following:
 - a. Purpose
 - b. Hypothesis
 - c. Do you accept or reject your hypothesis?
 - d. Explain why you accepted or rejected your hypothesis based on the data. Use data averages in your writing to support your claims.
 - e. Using scientific knowledge you gained in your research, explain why you think the results turned out the way they did. Explain the science behind the project.
 - f. Discuss future studies that could be conducted.
12. Acknowledgements-Contributions of persons who have helped you substantially with your investigation should be written in this section.
13. Works Cited-This section should be the last typed page of your paper. It includes only works that have been referred to or cited in your review of literature. You can use APA or MLA format, just be consistent. You may use a program to help you such as EasyBib.

Science Fair Board

The science fair display board will be worth 100 points. It will be graded on neatness, order, and creativity. You will need the following sections on your board:

1. Title
2. Purpose
3. Hypothesis
4. Materials
5. Procedure
6. Data (Tables, Graphs, Pictures)
7. Conclusion

Your board should read from left to right with the above order, except you may put the data on the center panel of your board.

Everything on the board should be typed or computer generated. No handwritten information should be on your board.

Be creative and neat. Your board will be the first thing the judges will see. Make a good first impression.

On science fair day, you should have your board, 2 copies of your paper with abstract, and your data book. Dress appropriately and have your presentation rehearsed. Make sure you understand your project and can explain it well. Be able to explain anything in your paper.

PROBLEM Question?	CREATIVE TITLE DATA Title of Chart Average Table with 4 columns and 4 rows	PROCEDURE 1. Step 2. by 3. Step 4. 5. 6. 7.
HYPOTHESIS Prediction	MATERIALS Specific List	CONCLUSION Answer Were you right? Possible errors Application
	Title of Graph Label Picture Caption Label Caption	



Science Fair Paper Grading Sheet

- | | | |
|-------------|--|---------------|
| I. | Title page, Table of Contents, Introduction | /10pts |
| II. | Purpose and Hypothesis | /10pts |
| III. | Review of Literature and Works Cited | /20pts |
| IV. | Materials and Procedure | /10pts |
| V. | Data | /20pts |
| VI. | Conclusion | /20pts |
| VII. | Abstract | /10pts |

Total /100

Science Fair Board Grading Sheet

A Board (90-100)

- **The board gives an excellent first impression. It has a “wow” factor.**
- **All required sections are on the board, computer generated, complete and in the correct order**
- **It has the use of matting, pictures, trim, and other decorative touches that give it a professional polished look.**
- **Everything on the board is neat, perfectly straight, and there are no signs of glue or tape.**

B Board (80-89)

- **The board gives a good first impression.**
- **All required sections are on the board, computer generated, complete and in correct order**
- **Use of matting and other decorative touches**
- **Looks neat and professional, but some minor flaws exist.**
- **No signs of tape or glue**

C Board (70-79)

- **The board is average and gives an average first impression**
- **All required sections are present and computer generated**

- Many flaws exist such as neatness, order, signs of glue or tape, and blandness.

D Board (60-69)

- Board does not give a good first impression
- All required sections are present but incomplete
- The board looks messy and unprofessional

F Board (<60)

- Board gives bad first impression
- Sections are missing or incomplete
- The board looks very messy
- Handwritten material found on board.

Timeline/Deadlines

October 11th: Team Application Due

November 1st-Paperwork Due (50 points) [Forms](#)(Adult checklist, student checklist, research plan, and approval form)

December 18th-Review of Literature and Works Cited Due (50 points)

January 10th-Final Draft of Paper Due (100 points)

January 13th and 14th-Class Presentations (Board must be finished) Board is worth 100 points.

January 15th-Alma High School Science Fair. Must be present or board grade will be reduced.

March -Regional Science Fair in Fayetteville (Bonus points)

March/April-State Science Fair in Conway (Bonus points)

May 10th-15th-International Science Fair in Anaheim, CA (Bonus points)

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 additional competition. They will also be dealt with according to school policy and subject to a failing grade on the project.

Team Project Application

Member 1

Name _____ Teacher _____ Period _____

Member 2

Name _____ Teacher _____ Period _____

Member 3

Name _____ Teacher _____ Period _____

Purpose of Experiment:

Proposed procedure: (attach a sheet of paper if necessary)

Why does this project need more than one person?

[Science Fair Rules and Forms](#)