

SEMINOLE

Middle School

Science Fair Project

Guidelines

BEGINNING YOUR PROJECT.....

1. Look for project ideas and share them with your teacher.
2. Projects that contain hazardous chemicals, involve humans or animals with backbones may not be used.
3. Write a hypothesis that can be tested and measured in an experiment.
4. Hypothesis must be written as “If....then.....because” statement.
5. There must be only one variable you change in the project – that’s the independent variable.
6. Once your teacher approves your idea, find background information and research on your topic.
7. You need five different sources for your bibliography.
8. A completed science fair project will include:
 - I. A data log (composition notebook)
 - II. A research plan
 - III. A research packet
 - IV. An abstract
 - V. A visual display

YOUR REPORT....

1. You must double-space the entire report.
2. Margins should be set at 1 inch on all sides.
3. Each section needs an appropriate label (title).
4. All pages should be numbered.
5. Do not use first person pronouns. **Do not use I, me, or we!** Use third person pronouns for yourself, like “researcher,” “scientist,” or “investigator.”

Bad Example: I built a time machine.

Good Example: The researcher built a time machine.

6. Be sure to check for grammatical errors and have your parents proofread your report, because these errors will affect your grade.

DATA LOG

1. You must keep a composition notebook. This is your **data log**. All of your data must be written here!
2. You must write in pen. You cannot use white-out! You must cross out mistakes with a single line.

Example: The project was started on ~~Wednesday~~ Thursday.

3. In case there is a mistake on your board, the judges will check this notebook.
4. It does not have to look perfect. It can have rip, tears, and stains. Your writing must be neat!
5. Every experiment must be described in the logbook.
6. All data collected must be in the logbook.
7. All graphs should be copied into the logbook.
8. All data should be in units. Examples are “meters, minutes, temperature, octopus eggs per week.”
Graphs must have more than numbers!
9. Every entry must be dated.
10. Do not throw them out after the project; you may need them to continue your project next year!

TITLE PAGE

1. The **title page** can be a declarative statement or a question that cannot be answered yes or no.
2. It should be short and concise but clearly indicate what the project is about.
3. Place your title in the middle of the page, centered on the page.

Example:

What Type of Kryptonite Affects Superman the Most?

STATEMENT OF THE PROBLEM

1. The **Statement of the Problem** briefly explains what question you will be answering with this research.
2. Center the label, Statement of the Problem, and then left justify your statement remembering to double space.

Example:

Statement of the Problem

In this experiment, the researcher will determine which type of kryptonite radiation affects Superman the most.

HYPOTHESIS

1. A **hypothesis** states what you think is going to happen when you investigate a question. It should be stated in one sentence using the “If . . . then. . . because . . .” format.
2. The hypothesis explains what you think will happen to the dependent variable when you manipulate the independent variable.
 - a. Independent variable – the variable the researcher (**YOU**) controls
 - i. Example – the color of kryptonite used on Superman
 - b. Dependent variable – what is being measured
 - i. Example - the radiation it leaves in Superman

Example:

Hypothesis

If red kryptonite affects Superman the most, then it will leave more radiation in his body because its energy affects his cells more.

BACKGROUND INFORMATION

1. **Background information** is a report on general information about your topic. It should be anywhere from 1-5 pages (depending on your teacher's preferences) in length and should be double-spaced.
2. Do not copy information word for word from your source. Summarize information into your own words.
3. The background information paper should have the project title at the top and the following 4 sections, each labeled with their appropriate title: Background Information, Materials Used in this Experiment, Previous Research, and This Research.
4. Be sure to keep information about each of your sources in order to complete your bibliography page later on.

Example:

Which Type of Kryptonite affectS Superman the Most?	Materials Used in this Experiment	Previous Research	This Research
<p data-bbox="155 1087 448 1119">Background Information</p> <p data-bbox="155 1188 475 1520">The purpose of this research is to determine which type of kryptonite affects Superman the most. The researcher will use green, red, gold, and blue kryptonite.</p> <p data-bbox="321 1892 337 1923">4</p>	<p data-bbox="526 1037 821 1419">Kryptonite is a meteorite from the exploded planet Krypton from the star system of the red sun Rao. It's chemical make-up is composed of several</p> <p data-bbox="672 1892 688 1923">5</p>	<p data-bbox="859 987 1105 1472">People who have previously written about kryptonite include Lex Luthor in the 1984 issue of Popular Science. In his experiments with kryptonite, Luthor finds that Kryptonite</p> <p data-bbox="976 1892 992 1923">6</p>	<p data-bbox="1131 987 1523 1369">This investigation will determine which color of kryptonite affects Superman the most. In this experiment, Superman will be exposed to different colors of kryptonite. Which colors are most effective will be measured by use of</p> <p data-bbox="1321 1892 1338 1923">7</p>

BIBLIOGRAPHY

1. List alphabetically all the resources used for your research. The title, Bibliography, should be centered at the top of the page.
2. You must include the following site as part of your resources used:
<http://www.browardscience.com/Fair.aspx>
3. You may wish to use the following website to help you format your bibliography page in APA format:
www.noodletools.com .
4. You need a minimum of five sources.

Example:

Bibliography

Books with One Author:
Siegel, J. (1939). History of Krypton. Smallville, Schuster Publishing

Books with More Than One Author:
Lane, L. & Kent, C. (1993) Science and the Man of Steel. New York, Daily Star Publishing

Article in a Magazine
Hamilton, E. (2005, March) Kryptonian Anatomy. Nature, 6,137-140, 142.

Article in an Encyclopedia
Richards, R. (1961). Cosmic Radiation. In *World Book Encyclopedia* (Vol. 4, p. 898). Cincinnati: Babson Press.

Web Site with No Author
Radiation. (n.d.). In *Merriam-Webster's online dictionary* (11th ed.). Retrieved from <http://www.m-w.com/dictionary/plants>

Web Site with an Author
Wayne, B. (2007) *Synthesizing Kryptonite on a Budget*. Retrieved June 24th, 2009 from <http://www.howtomakekryptonite.com>

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RESEARCH PLAN

The **research plan** is a preview of what your research packet will have. The research plan is one page or less in length. It has the following sections:

Section 1: Your Question

Write down what question you are trying to answer.

Section 2: Your Hypothesis

Write down what your hypothesis is.

Section 3: Your Procedures

Describe all the steps you will use in your experiment to gather data.

Section 4: Data Analysis

Describe how you will use the data you gather to answer your question and hypothesis.

Section 5: Bibliography

List at least five sources you have used in your research. This includes books, articles, and internet sites. Write them in the style below (called APA style).

Research Plan

The researched wanted to know how different colors of kryptonite affect Superman.

The researcher's hypothesis was that if red kryptonite affects Superman the most, then it will leave more radiation in his body because its energy affects his cells more.

Superman was placed in a lead-lined room. Each week he was exposed to a different color of kryptonite. Every hour for one day after a gieger will measure the strength of the radiation.

The researcher will analyze the data to see which kryptonite leaves more radiation.

Bibliography

Dox, V. & Luthor, L. (2007) *Kryptonite Radiation!*. Retrieved June 24th, 2009 from <http://www.howtokillsuperman.com>

Kord, T (1986) *Serious Heroes*, New York, Adams Books

Moore, A. (1986, March) The Super-Hero Anatomy Lesson. *Exobiology*, 6.137-140, 142.

Myers, P (2004) *Alien Evolution*, New York, Alan Smithee Books

Parker, P (1961) *Superheroes & Radiation*. New York, Timely Publishing

EXPERIMENTAL DESIGN

1. The **Experimental Design** pages must include a description of variables, the number of items to be tested, a list of materials, procedures, tables and graphs.
2. On the first page, using the title “Description of Experimental Design”, list and identify the independent variable, dependent variable, constants, experimental group, and the control group, then identify the number and names of items to be tested.
3. On the second page, using the title “Materials”, list in numbered format the items needed to complete the experiment. Be certain to give exact amounts and measurements.
4. On the third page, using the title “Procedures”, list the steps to the experiment.
5. On the fourth page, display a data table with a title at the top and units of measurement labeled.
6. On the fifth page, display graphs that represent the information in the data table. Be certain to have a title at the top, the independent variable along the y axis, and the dependent variable along the x axis.

Example:

Description of Experimental Design	Materials	Procedures	Data Table	Graph															
<p>Independent variable: type of kryptonite</p> <p>Dependent variable: effect on Superman</p> <p>Constants: the size of the kryptonite sample, the room temperature, Superman’s heart & breathing rate, time of exposure</p> <p>Experimental group: different colors of kryptonite</p> <p>Control group: generic meteorite</p> <p>In this experiment, there are 4 colors of kryptonite being tested: green, red, gold, and blue.</p> <p style="text-align: center;">10</p>	<ol style="list-style-type: none"> 1. Four 15x15x15 cm cubes of red, green, gold, and blue kryptonite. 2. Geiger counter 3. Superman 4. Lead-lined room 5. Radiation suit. <p style="text-align: center;">11</p>	<ol style="list-style-type: none"> 1. Put Superman in lead-lined room. 2. Put on radiation suit. 3. Expose Superman’s limb to kryptonite 4. After five minutes, remove kryptonite 5. Each hour later, use Geiger counter to measure Superman’s radioactivity. 6. Expose other parts of Superman’s body over the following days. <p style="text-align: center;">12</p>	<p style="text-align: center;">Data Table</p> <table border="1" style="margin: auto;"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table> <p style="text-align: center;">13</p>																<p style="text-align: center;">Graph</p> <p style="text-align: center;">(Bar Graph, Line Graph, Pie Chart)</p> <p style="text-align: center;">14</p>

DATA ANALYSIS

1. The **Data Analysis** gives the reader a clear, concise explanation of what you found out.
2. Be certain to answer questions found during the investigation and background research. Examples
 - a. How did the researcher's results compare to results obtained by other similar investigations?
 - b. How are the results meaningful?
3. Explain in paragraph form what the data table and graph say. Be sure to refer to the tables and graphs by label and number.

Example:

Data Analysis	
In trial 1, the generic meteorite left .0009 rads of radiations, the green kryptonite left 278 rads, the red kryptonite left 167 rads, the gold kryptonite left 46 rads, and the blue kryptonite left 68.99 rads. This is shown in Data Table #1 and Graph # 3.	
In trial 2,.....	
In trial 3,	
The average rads of radiation caused by the generic meteorite was.....	
The average rads radiation caused by the green kryptonite was.....	
The average rads radiation caused by the red kryptonite was.....	
The average rads radiation caused by the gold kryptonite was.....	
The average rads radiation caused by the blue kryptonite was.....	
Analysis indicates that, in all cases, green kryptonite left more radiation (measured in rads) than any other color of kryptonite tested.	
This is different than what was reported by Dox and Luthor in that...	

CONCLUSION

1. The **Conclusion** is a brief summary of the report.
2. Restate your original hypothesis.
3. Explain why you accept or reject this hypothesis.
4. If you reject your hypothesis, make a revised hypothesis.
5. Describe any problems or unusual events that occurred during your investigation.

Example:

Conclusion

This research was done to determine which color of kryptonite affects Superman the most. The hypothesis was if red kryptonite affects Superman the most, then it will leave more radiation in his body because its energy affects his cells more.

In this experiment, green kryptonite absorbed more, on average, than the other colors tested. The other colors...

The data does not support the hypothesis. Instead, the data suggests the hypothesis that green kryptonite affects Superman's cells more.

In addition, only four colors of kryptonite were tested. For further experiments, other types of kryptonite such as black, white, or jewel kryptonite. Further, other kryptonians aside from Superman could be tested, including General Zod, Krypto, Supergirl....

There are two problems the researcher would avoid in the future while repeating the project. A more precise Geiger counter would get better measurements. Red kryptonite wouldn't be used, as it gave Superman an ant head and agitated him considerably.

APPLICATION AND RECOMMENDATIONS

- 1) In the **Application** section, you state how your experiment can be of practical value – how it can be used in the real world to help people or make a job easier.
- 2) In the **Recommendation** section, explain what you would do differently if you did the experiment again. What other variables might you test? What might have caused any errors in the data and should be changed next time?

Example:

Application

The research indicates that Superman should be more careful around green kryptonite, possibly building a containment suit...

The research could also be used in case Superman ever turns against humanity....

Recommendations

This researcher recommends testing many more colors of kryptonite. Testing should also be done on many more kryptonians.....

ACKNOWLEDGEMENTS

1. On the **Acknowledgements** page, you need to say thank you to the people who helped you with experiments, materials, research, or writing.

Example:

Acknowledgements

This researcher would like to thank the staff at Lex Corp Industries for providing the kryptonite used, including

The researcher is also grateful for Dr. Emil Hamilton for giving suggestions on the safe handling of kryptonite.

Thanks should also be given to the staff of the Daily Planet for proof-reading and writing assistance, including...

APPENDIX

1. In the **Appendix**, include copies of photographs you have on your display with photo credits. You should also include letters received from people for you communicated with.

APPENDIX



Photograph by Jimmy Olsen, used with permission.



Photograph taken by researcher.

LEX CORP INDUSTRIES

1939 Schuster Way, Metropolis, NY 5555

Dear Sir,

We congratulate you on your interest in kryptonite. We would be honored to help you with your science project. First, we offer you 100 lbs or each color of....

.....
.....
.....
.....
.....

Good luck. Our CEO himself is interested in your experiments.

Sincerely,

.....
.....

DISPLAYING THE PROJECT

Photo/Image Credits

All photos or images used on the display must be credited. Beneath the photo or image must be labeled “Photo taken by _____” or “Image from _____.” If the source is not YOU, you must get permission from the owner/photographer/website owner. In that case, at the end, write it as “Photo taken by _____, used with permission”

Example: “Photograph taken by Carl Kolchak, used with permission.”

Maximum Size of Project

Depth (front to back): 30 inches or 76 centimeters

Width (side to side): 48 inches or 122 centimeters

Height (floor to top): 108 inches or 274 centimeters

Fair-provided tables will not exceed a height of 36 inches (91 centimeters).

Forbidden Display Pages

You may not display a bibliography, or any abstract that is not on the official ISEF form.