

Detailed Directions

for

Completing a Science Fair Project

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COMPLETING AN EXPERIMENT USING THE SCIENTIFIC METHOD

QUESTION OR PROBLEM

A question should be stated that could be answered by performing an experiment. AN EXPERIMENT IS NOT THE SAME AS A DEMONSTRATION. An experiment involves research and testing of an idea. A demonstration simply shows how to do something or shows how something works. Demonstrations are not experiments, and are not acceptable for a science fair project.

RESEARCH

Research involves learning all that you can about your subject. Sources where information can be found include the Internet, books, encyclopedias, magazines, newspapers, speaking with an expert in the field (such as a doctor, scientist, pet store owner, etc.), or writing to the manufacturer of a product. Include all your research in your journal. Choose 10 facts from your research to put on your science fair board.

HYPOTHESIS

A hypothesis is an educated guess. After your research has been done, you will be able to make an educated guess about how you think the experiment should turn out. You should state what you think will happen and why you think it will happen. (Example: I think snails will prefer to eat lettuce because the books I read say snails like green leafy foods.) It is ok if your final result ends up different from your original hypothesis.

MATERIALS LIST/ PROCEDURE

Provide a detailed materials list of all the items a person needs to perform your experiment. Write step-by-step procedures for performing your experiment.

EXPERIMENT/ OBSERVE/ COLLECT DATA

If possible, take pictures of you performing your experiment to put on your board. Record all of your observations and record data you collect in your journal. Don't forget to perform your experiment at least two times or be sure to use a large sample size (i.e. use more than one plant, or grow more than one crystal, etc.). You will average the results of each time you repeated your experiment together.

RESULTS

This section should include two things. 1) Organize your data in a chart or a graph. (Don't forget to label your graph/ chart and give it a title.) 2) Give a written explanation of what the graph or chart shows just below the graph or chart.

CONCLUSION

State whether your hypothesis was correct or incorrect and why. This is also a good place to explain how you would do this experiment differently if you could do it over.

JOURNAL

A journal is a written diary of what you did on your science fair project from start to finish. Everything that is on your science fair board will also be in your notebook. See page 2 for a full explanation of what should be in your journal.

PRESENTATION

The project should be mounted on a three-sided board that can stand up on its own. See page 6 for board requirements. You may make a display board or purchase one a local craft store. You will also give a short oral presentation to explain your project. See page 7 to help you prepare for the presentation.

THE SCIENCE FAIR JOURNAL

The science journal must be in a notebook or a folder and divided into the following parts:

I. TITLE PAGE

This should have the title of the project, the question or problem, your name, date, grade, and your teacher's name.

II. TABLE OF CONTENTS

III. ABSTRACT

This is a one page summary of you entire project. See page 3 for directions and an example on how to write an abstract.

IV. RESEARCH

This is a detailed summary of information you obtained from the Internet, books, magazines, encyclopedias, newspapers, interviews with experts, etc. If you speak with experts and/ or contact manufacturers, you should include the names of people you spoke with, give their job titles, and state the information they provided you. The research in the journal should be everything important you found about the subject. It will be much longer than the information you include on your backboard, which is simply a summary of the research of the research in ten sentences.

V. HYPOTHESIS

This is an educated guess that you make AFTER doing your research. State what you think will happen in your experiment, and why you think it will happen. (I think that _____ because _____.)

VI. MATERIALS

List the materials you used to conduct your experiment.

VII. PROCEDURE

Give detailed, step-by-step directions on how to conduct your experiment. Be specific so that someone else could perform the experiment exactly the way you did by following your steps. Be sure to indicate that the experiment should be repeated a number of times.

VIII. DIARY

This is a handwritten diary what you did to complete your project from start to finish. Date each entry. Be sure to include any observations, measurements, and calculations in your diary.

IX. RESULTS

Tell how your experiment turned out. Explain in words what the data in your charts and/or graphs shows. Discuss all possible factors that might have influenced your results.

X. CONCLUSION

Tell whether or not your hypothesis was correct. Include ways that you could change or improve your project if you did it again. Tell about any unanswered questions you still have. Make recommendations for other experiments related to this topic. How would you change the design of the experiment to eliminate the problems and make it a better test? What were some of the conditions that were impossible to control? What did you learn from the experiment that you did not expect?

XI. ANNOTATED BIBLIOGRAPHY

List all the research sources you used. (See p. 4 for directions, and p. 5 for an example.) Entries should be listed in alphabetical order. After each source, write one sentence that tells what the book or Internet source was all about.

HOW TO WRITE AN "ABSTRACT"

The abstract is a one page summary of your entire project. Follow the following outline, and keep it brief. Remember this should only be ONE PAGE.

TITLE:

YOUR NAME:

SCHOOL NAME:

GRADE:

TEACHER:

I. OBJECTIVES/GOALS

Briefly describe or define your topic. What did you want to find out? ("I wanted to find out more about....) State your hypothesis. ("My hypotheses was....)

II. METHODS AND MATERIALS

Briefly explain what materials you used, and how you conducted your experiment.

III. RESULTS

Briefly explain the results of your experiment. (What happened?)

IV. CONCLUSION

Briefly describe what you found out. Did you prove your hypothesis to be right or wrong? Why? Is there anything that you would do differently in the future?

ABSTRACT (EXAMPLE)

Does the rate at which a solution is cooled affect the crystal's growth?

Karen Cougar
Caryn Elementary School
Grade 4 or 5
Mrs. Lavender

Objectives/ Goals: The objective of my project is to find out if alum crystals will grow bigger in the refrigerator, or at room temperature. I thought the room temperature crystals would grow bigger.

Methods and Materials: I used a saturated alum solution, and alum crystal seeds. I hung a crystal seed from a thread on a popsicle stick and put the seed into the solution in a mason jar. I put three jars with alum seeds in the refrigerator, and left three jars on the sink. I watched the crystals grow for one week.

Results: According to my measurements and observations, the crystals in the refrigerator grew bigger.

Conclusion: My hypothesis was not correct. I still have questions about why the refrigerator crystals grew bigger when the research said that the slower the solution cools, the bigger the crystal will be. I would like to repeat the experiment to see if I get the same results.

HOW TO WRITE AN ANNOTATED BIBLIOGRAPHY

You must site the sources from which you have gathered information. There is a particular way to site different type sources. Follow these guidelines.

BOOKS:

Author's last name, author's first name. Title of Book. Place of publication: publisher, date of publication.

This book is about _____.

MAGAZINES:

Author's last name, author's first name. "Title of article." Name of Magazine. Volume (month and year). Page numbers.

This article is about _____.

ENCYCLOPEDIAS:

"Entry Title." Name of the Encyclopedia (publication date). (Volume number.) Place of publication: publisher.

This article tells about _____.

Electronic Sources:

Title [type of medium]. (Date) Available: write the supplier/publisher here.

Example:

Oxford English Dictionary Computer File [CD-ROM]. (1992) Available: Oxford

This CD-ROM gives definitions for words in the English language.

INTERNET RESOURCES:

Author's last name, author's first name if given. "Title of article" [online]. Available: write the website address. [date accessed].

This website tell about _____.

**** Once you have written your resources in the correct format, put them in alphabetical order according to the first word in the entry. Indent the second or third line of each entry. Don't forget to write one sentence explaining the content of each source.
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See page 5 for an example.

EXAMPLE OF AN ANNOTATED BIBLIOGRAPHY

Bennett, Andrew and Macias, Mark. Planets and Stars. New York: CreativePublications, 1989.

This book is about the nine planets in our solar system.

“Kangaroos.” World Book Encyclopedia (1996). (Vol. K.) Chicago: World Book, Inc.

This article gives complete information about kangaroos.

Mearns, Albert and Orr, Robert. “Gulls.” Ranger Rick. (September, 1994). Pp. 38-39.

This article is about the different species of gulls and their habitats.

Pritzker, T.J. “How Gorillas Live.” [online] Available: <http://usa.soo.k12> [January 12, 1992].

This website gives information on gorillas and their habitats.

Science Display Board

1. Projects must stand on their own. (Recommendations: foam board, peg board, or heavy cardboard.)
2. Projects must stand up on a table.
3. Size limit: 2 ½ feet high and 3 feet wide.
4. A journal must accompany the project (put details into the journal).
5. Title the project.
6. Be neat and keep it simple.
7. Type or write clearly.
8. Use the computer, stencils, or press on letters to make labels.
9. Check spelling.
10. Putting pictures of you doing the experiment is optional, but adds a nice touch.

PROJECT TITLE		
Problem	Materials	Results (graph, chart, and/or table)
Research	Procedure	
Hypothesis		Conclusion

These things should be on your board:

1. Your name
2. The Problem (Question)
3. Hypothesis
4. Procedure
5. Results of experiment organized in a graph, chart, or table.
6. Your conclusion

Optional on board, but must be in journal:

1. Research (10 facts from your research)
2. Materials list

MY ORAL PRESENTATION

Use the following outline as a guide.



My name is _____.

The **title** of my project is _____.

Two interesting things I found out during my **RESEARCH** are _____

The **QUESTION** I asked was _____

The **HYPOTHESIS** I formed was _____

The **PROCEDURE** I used to test my hypothesis was to _____

I repeated this procedure _____ times to make certain that my results were valid.

The **RESULTS** of my experiment were _____

The results showed that my hypothesis was _____

(supported or not supported)

The **CONCLUSION** I reached was _____

If I were to do this investigation again, I would _____

CARYN SCHOOL SCIENCE FAIR
JUDGING FORM

STUDENT _____

TOTAL SCORE _____(60)

TEACHER _____

GRADE LEVEL _____

STUDENT PRESENTATION

1. The student is able to demonstrate that he/she has planned and organized the experiment. 0 1 2 3 4 5

2. The student demonstrates a clear understanding of the...
 - a. Problem and Hypothesis 0 1 2 3 4 5
 - b. Procedure 0 1 2 3 4 5
 - c. Observations 0 1 2 3 4 5
 - d. Conclusion 0 1 2 3 4 5

3. During the presentation, the student
 - a. Explained the experiment well enough for the class to see and appreciate the project. 0 1 2 3 4 5
 - b. Enabled the class to arrive at the same conclusion. 0 1 2 3 4 5
 - c. Demonstrated an understanding of remaining unanswered questions. 0 1 2 3 4 5

4. Creativity
The problem is original or is a unique approach to an old problem. 0 1 2 3 4 5

5. Scientific Thought
The experiment shows depth of study and effort. 0 1 2 3 4 5

6. Thoroughness/ Organization
 - The display reflects the logical progression of the project, in addition to being neat and organized. 0 1 2 3 4 5
 - The journal is neat, organized and complete 0 1 2 3 4 5