PROVIDENCE CHRISTIAN SCHOOL

SCIENCE FAIR NOTEBOOK GUIDE

Name: _____

Revised: October 7, 2008

PAGES IN THIS GUIDE

2008-2009 Science Fair Project Due Dates

The following due dates have been assigned to the individual parts of the science fair project. Please refer to your Science Fair Notebook Guide for details about each part of the book. We will also go over each part in class before it is due.

Thursday, August 28th	Brainstorm Topics
Tuesday, September 2nd	Topic Due-Public library trip
Thursday, September 4th	6 Bibliography cards
Thursday, September 11th	10 Notecards (7th, 8th grades)(7 for 6th)
Thursday, September 18th	40 Notecards (7th, 8th grades)(27 for 6th)
Thursday, September 25th	60 Notecards (7th, 8th grades)(40 for 6th)
Thursday, October 2nd	Outline
Tuesday, October 7th	Problem, Hypothesis
Thursday, October 9th	Preface, Acknowledgements
Tuesday, October 14th	Bibliography
Thursday, October 16th	Procedure, Equipment and Materials
Tuesday, October 21st	Research paper with Bib. (2 copies)
Thursday, October 23rd	Human Subject Experiments (conducted at school)
Tuesday, October 28th	Human Subject Experiments
Thursday, October 30th	All experiments should be finished Observations and Results
Tuesday, November 4th	Graphs
Thursday, November 6th	Conclusions
Tuesday, November 11th	Notebook Table of Contents

Thursday, November 13th	Abstract
Tuesday, November 18th	Notebook Due
Thursday, December 4th	Oral Repots and Backboards
Thursday, December 11th	**PCS SCIENCE FAIR!!!**
Tuesday, December 16th	Research Plan for Regional Qualifiers
Thursday, December 18th	Regional paperwork due

Science Fair Notebook Grades

Each student will be producing a science fair notebook. Your Technology grade will include a grade for your graphs. In Library, your grade will be based on your research paper citations and bibliography form. In Science, your notebook content will be a quiz grade, your oral presentation will be a quiz grade, and the science content of your research paper will be a test grade. In English, your research paper outline, introduction, conclusion, and general paragraphing style will be graded. Your rough draft of the research paper will be corrected, so that you can make changes and raise your grade.

The order of the science fair notebook is as follows:

Notebook cover-slid in front of notebook cover
Red Pen Corrected research paper and bibliography-in front pocket of notebook for comparison to see if you made changes
The following papers are put in the clear protective page protectors:

Abstract
Table of Contents
Acknowledgements
Preface
Problem
Outline
Final Research Paper
Final Bibliography
Hypothesis
Equipment and Materials
Procedure
Observations and Results
Graphs
Conclusions

If you go to Regional Science Fair, then you will also do a Research Plan which will be the final pages of your notebook.

Science Fair Notebook Grade

Cover-5 points _____

Abstract-10 points _____

Table of Contents-5 points _____

Acknowledgements-5 points _____

Preface-5 points _____

Problem-5 points _____

Outline-5 points _____

Corrected Research Paper-15 points _____

Bibliography-10 points _____

Hypothesis-5 points _____

Equipment and Materials-5 points _____

Procedure-5 points _____

Observations and Results-5 points _____

Graph-10 points _____

Conclusions-5 points _____

Total _____

Topic Ideas

Here are some sources for science fair topic ideas:

1. Your own imagination. Think of a question that you have wondered about or are interested in. Make the idea into a hypothesis. Suggestion on how to do this are at http://school.discovery.com/sciencefaircentral .

2. Books at the PCS library. We will keep them at school so that all students may use them. Parents may come in and browse them also.

3. Books from the public library. Be cautious not to select a demonstration project without a hypothesis. Some of my favorites are:

   Prize-Winning Science Fair Projects for Curious Kids by Rhatigan and Newcomb

   Blue-Ribbon Science Fair Projects by Maxine Haren Iritz

   Blue Ribbon Science Fair Projects by Glen Vecchione

   100 First-Prize Make-It-Yourself Science Fair Projects by Vecchione

4. Internet-Here is a sample of some web sites:

   Discovery School- Topic ideas in various science genres and how to create your own topic. http://school.discovery.com/sciencefaircentral .

   Science Project- This site has many great topic ideas and way to alter these ideas to make unique projects. A $25 membership fee allows you more detailed access to scientists on three projects. www.scienceproject.com

   Terimore Institute- This pay site offers numerous topic/experiment ideas. Most of the ideas cost only $6.95 each and come with some nice background material on the subject. www.terimore.com .

☻ **The best way to design an experiment if you want to gain a depth of understanding is to ask an expert. If you need help finding an expert on your topic, please talk to Mrs. Johns**

Giving Your Experiment a Title

When you give your experiment a title, it is best to be specific. A broad title gives the judges the impression that you were not focused in your research. It is a good idea to have a catchy title followed by a colon and then your specific title.

Examples of good titles are as follows:

> "What's Brewing in Your Tea: A Comparative Analysis of the Rate of Colonization of Coliform Bacteria in Sun Tea Versus Stove Brewed Tea."
>
> "Watching Grass Grow: The Effect of Residential Wastewater and Reverse Osmosis Brine on the Growth Rate of Seashore Paspalum Turfgrass."
>
> "Made in the Shade: Are Subjects Better Able to Distinguish Shades of Color in Different Watts of Light?"
>
> "The Hidden Message uncovered: The Influence of Subliminal Messaging on Human's Choice of Ink Color."

Experiment Design:

Before you begin your experiment, make sure that you get approval of your methodology. The more specific you are in your plan, the more that the teachers can help you in your design and save you from making mistakes that you will have to correct later. **REMEMBER TO MEASURE IN METRIC!!!** Otherwise, you will have to convert your data later. **TAKE PICTURES!!!!!**

You will be given topic forms to fill out for your topic to be approved and for the teachers to help you by making experiment design suggestions. We will also meet in groups and get peer input.

Note on Research Paper: When you are doing your research paper research, it will be on a broader topic than your specific experiment. For the above experiment titles, examples of research paper topics are:

> Tea (covering the history of tea and some research on sun tea)
> Grass (covering types of grass and what helps it grow better)
> Light (covering properties of light and how the eye views it)
> Subliminal Messaging

If you are doing a plant project, the topic of your research paper may be "Plants." The more specific research you find to your topic, however, the more knowledge you will have when judges question you. If you are doing a continuing project, your research paper must be different from last year.

The Abstract

- The following is the regional science fair form that must be used for the abstract.
- There are to be NO reference listings on the abstract.
- You will need THREE copies of your abstract: one for the book, one for the lower left hand corner of your board, and one for Mrs. Johns.

Project Title (as it appears on project and entry forms)

Student Name(s) (do NOT identify school, home address, phone, email, or other personal identifiers)

Division (Junior or Senior)
Category

Abstract Text
- Single spaced
- 250 words or less
- 12 point type

Table of Contents Page

The table of contents is the reader's guide to finding each part of your research notebook with ease. Follow the example and the following guidelines to create your own table of contents:

- Center the words TABLE OF CONTENTS at the top of the page in caps in font size 14. The rest of the page is font size 12.
- Replace the # in the example with the appropriate page number from your notebook. Page numbers vary according to the length of your research paper.
- Replace the _____ in the example with the title to your research paper.
- The table of contents page is numbered *i* (italicized lower case letter i).

TABLE OF CONTENTS

The Acknowledgments Page

The acknowledgments page is where you give thanks to those who have given you guidance, assistance, support, or help at some time during the process of doing your project. You may include your parents, outside professionals, librarians, teachers, etc.

- Use Times New Roman font size14 for the heading.
- The heading of the page should read ACKNOWLEDGMENTS centered on the top line in all capital letters.
- The text of the page should be in Times New Roman font size 12.
- It is usually two to three sentences, but it may be more if necessary.
- This page is numbered *ii* on the center of the bottom line.

ACKNOWLEDGMENTS

I would like to thank my mother for all of her help in the process of researching my topic for . . .

ii

The Preface Page

The preface page should address what interest you have in this particular subject, why you chose this topic, how you came up with the idea, and why the information obtained from this project is important.

- Center the word PREFACE on the top line in Times New Roman font size 14 all in capitals.
- The text of the page should be in Times New Roman font size 12.
- It is usually 4-5 sentences but use as many as you like. The more detailed and descriptive the better. Sell your project!
- This page is numbered *iii* on the center of the bottom line.

PREFACE

The science of meteorology has seen many changes over the past twenty years due to technological developments and advances. I have always been very interested in weather. After reading a book about science fair projects involving weather, I decided to research and experiment on cloud seeding. The information derived from my project can be useful . . .

iii

The Problem Page

The problem page is the question you came up with to begin your research and experiment.

- Center the word PROBLEM on the top line in Times New Roman font size 14 all in capitals.
- The text of the page should be in Times New Roman font size 12.
- The text of this page is often only one sentence. You may use more but be concise.
- This page is numbered 1 on the center of the bottom line.

PROBLEM

Are daily temperatures easier to predict in tropical climates than in temperate climates?

The Outline

- The title should be in caps font size 14 and the body in font size 12.
- Type your thesis statement on the line before your outline.
- This page is numbered 2.
- Below is a sample outline. It should be a topical outline.

Sugar and Ants

Thesis: Ants are an important component of the ecosystem, and it is essential to understand their anatomy, varieties, habitat, and diet in order to learn how to best interact with them.

I. Sugar
   A. Natural
      1. White
      2. Brown
      3. Honey
   B. Artificial
      1. Saccharin
      2. Aspartame
II. Ants
   A. Parts of Ants
      1. Head
      2. Thorax
      3. Pentoil
      4. Abdomen
      5. Antenna
      6. Legs
   B. Type of Ants
      1. Queen
      2. Drone
      3. Workers
   C. Habitat
      1. Tree/Stump
      2. Mounds/Colonies
III. Dietary Needs
   A. Sugar
      1. Artificial
      2. Natural
      3. Sap
   B. Leaves
   C. Eggs
   D. Plant Juices
   E. Honeydew

Bibliography Page

The bibliography page shows the resources used and cited in your research paper.

- Center the word BIBLIOGRAPHY on the top line using New Times New Roman font size 14 all in capitals.
- The text of the page should be in Times New Roman font size 12.
- List entries in alphabetical order. Titles in italics.
- Indent after the first line. Skip a line between entries.
- This page is numbered on the center of the bottom line. The page number will depend on you individual notebook and the length of your research paper.
- You must have at least 6 references-including one book, one periodical, and one reference.

BIBLIOGRAPHY

Barton, David. "Religious Founders? Read their Writings." 2008. <http.://www.wallbuilders.com/frame 2> (accessed 11 Sept. 2008). [INTERNET EXAMPLE]

Couvillion, Mark. "Christians in the Cause: Five Champions." *Christian History,* 1996, 18-21. [MAGAZINE EXAMPLE]

"Frog." *Encyclopaedia Britannica.* 2008. Encyclopaedia Britannica Online School Edition. <http.: //school.eb.com/eb/article-9035479>. [ONLINE ENCYCLOPEDIA EXAMPLE]

International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs, 2009. Intel ISEF SRC, Science Education Department, Washington, DC. **[THIS CITATION MUST BE IN EACH BIBLIOGRAPHY!!!!!!]**

Hughes, Jonathan. *American Economic History*. New York: Franklin Watt, 1998. [BOOK EXAMPLE]

Kistiakowski, Vera. "Nuclear Energy." *The World Book Encyclopedia*, 2005 ed. [PRINT ENCYCLOPEDIA EXAMPLE]

"Light." *Encarta 2008.* CR-ROM. Microsoft, 2008. (CD example)

Toner, Robin. "Senate Approves Welfare Plan That Would End Aid Guarantees." *New York Times,* 20 Sept. 1995. *Electric Library,* Sept. 2008. [PUBLIC LIBRARY DATABASE EXAMPLE].

#

Library Science Fair Rough Draft Research Paper And Bibliography Grading Criteria

Student Name _____

Rough Draft Grade _____

Number of citation sources (3 required for S, 5 required for E) _____

All appropriate material cited _____

Met required length _____

All citation sources are included in bibliography _____

Typos _____

Rough Bibliography Grade _____

Number of sources (6 required) _____

International Science Fair Rules included _____

Included 1 periodical, 1 reference, and 1 book _____

Proper Form _____

Submitted by Due Date _____

Comments:

The Hypothesis Page

The hypothesis page is where you state what you think will happen when you perform your experiment. It is what you thought before the experiment began, your educated guess. It is your problem question changed into a statement.

- Center the word HYPOTHESIS on the top center line in Times New Roman font size 14 all in capitals.
- The text of the page should be in Times New Roman font size 12.
- The text of this page is often only one sentence. Do not use "I think . . .".
- This page is numbered on the center of the bottom line. The page number will depend on you individual notebook and the length of your research paper.

HYPOTHESIS

Daily temperatures are easier to predict in tropical climates than in temperate climates.

#

Equipment and Materials Page

The equipment and materials page is where you list the materials that you used to conduct your experiment. Do not list items used to do your research, make your notebook, or create your display board. It is like the ingredient list of a recipe, but this list is for a scientific experiment.

- Center the words EQUIPMENT AND MATERIALS on the top line using New Times New Roman font size 14 all in capitals.
- The text of the page should be in Times New Roman font size 12.
- The text is in list form. Be specific and give measurements as necessary.
- Use metric.
- This page is numbered on the center of the bottom line. The page number will depend on you individual notebook and the length of your research paper.

EQUIPMENT AND MATERIALS

The following materials were used to conduct this experiment:

100 ml glass beaker
300 ml of water
2 mg of salt
1 two liter bowl
6 ice cubes
1 heat lamp
1 sheet black paper
1 stop watch

#

Procedure Page

The procedure page is where you list the steps required to conduct your experiment. It is like the steps of a recipe, but these steps are for a scientific experiment. Do not list steps involved in doing your research, making your notebook, or constructing your backboard.

- Center the word PROCEDURE on the top line using New Times New Roman font size 14 all in capitals.
- The text of the page should be in Times New Roman font size 12.
- The text is in list form. Be specific and do not leave out any steps.
- Use metric.
- This page is numbered on the center of the bottom line. The page number will depend on you individual notebook and the length of your research paper.

PROCEDURE

1. Take one glass jar and fill with 20ml of water
2. Add 2mg of salt to the water in the jar.
3. Place the jar with the water and salt on the piece of black paper.
4. Place the bowl over the opening of the jar.
5. Put six ice cubes and 1ml salt in the bowl.
6. Aim heat lamp at the base of the jar and turn on the lamp.
7. Using a stopwatch, record changes in the jar and time.

#

Observations and Results Page

This page is where you give a report of the observations and results of your experiment. You should report a summary of your log book findings here. Also give the results of your experiment. You may include a spread sheet of data in this section of your notebook.

- Center the words OBSERVATIONS AND RESULTS on the top line using New Times New Roman font size 14 all in capitals.
- The text of the page should be in Times New Roman font size 12.
- Give all data. Do not leave anything out. Be specific.
- Use metric.
- This page is numbered on the center of the bottom line. The page number will depend on you individual notebook and the length of your research paper.

OBSERVATIONS AND RESULTS

Day 1: Group A plants were average height of 5 cm.
Group B plants were average height of 5 cm.
Group C plants were average height of 5cm.

Day 12: Group A plants were average height of 5.3 cm.
Group B plants were average height of 5.4 cm.
Group C plants were average height of 5.2 cm.

Day 20: . . . and so on. . .

Graphing in Excel

1. Enter data in spreadsheet
   upper left corner blank (A1)
   column information down side cells in A2, A3, A4, etc.
   put x-axis information across top cells in B1, C1, D1, etc.

Sample: Snail deaths per wood type

	10/4	10/18	10/22	10/25	10/29	11/1
Control	0	1	1	1	1	1
CCA treated	0	14	14	14	14	17
Pau Lope	0	10	12	12	12	12
Greenheart	0	0	0	0	0	0
Recycled plastic	0	0	0	0	1	1

2. Highlight all of the data you want graphed
3. Click on graph icon in toolbar
4. Step 1—choose type of graph you want (try different ones)
5. Step 2—should display graph-click next
6. Step 3—chart options
   Title-label graph
   Label X axis
   Label Y axis
   For pie charts click on data labels tab and check percentage
7. Step 4—Select new chart
   Name your graph for your information to save
   Click finish
8. If you want to change color of columns double click on bars and
   click on color you want. To change background double click on
   background and select new color.

Note: Some charts are small and make good pie charts. Many behavioral projects are this way.

Sample: Could students pick up a chair with their head against the wall?

	Yes	No
Boys	22	8
Girls	15	15

Conclusions Page

This is the page is where you tell whether you found the answer to your problem. If you did answer your problem, on what did you base this determination? If you did not, is there another experiment you might do to find the answer to your problem?

- Center the word CONCLUSIONS on the top line using New Times New Roman font size 14 all in capitals.
- The text of the page should be in Times New Roman font size 12.
- The text is usually 2-3 sentences.
- Use “the researcher” instead of “I”.
- This page is numbered on the center of the bottom line. The page number will depend on you individual notebook and the length of your research paper.

CONCLUSIONS

After recording and analyzing temperature predictions and temperature readings for one month in a city of temperate climate and a city of a tropical climate, the researcher found that predictions in tropical climates are more accurate than predictions in temperate climates.

#

Oral Presentations

Your oral presentation will be 3-5 minutes long. You will give the presentation to your teachers and peers in class and then to the judges at the PCS Science Fair. It will be graded for a science quiz grade. Your backboard will be graded for a separate technology quiz grade.

You may have your presentation on note cards, but give your audience eye contact. You may use your display board for explaining your information. Make sure your display panels are in a font large enough to be read. Graphs should be very readable because they illustrate your results.

Begin your presentation will a catchy idea or question. For example,

- "Cape Coral currently disposes of approximately 100,000 gallons of unusable brine each day at the cost of $95,000. The city also spends $235,000 per square mile to get rid of Brazilian Peppers in open grassland. There may be a way to solve both these environmental problems while saving the taxpayers money."

- "Did you know that barbers used to be surgeons because people considered them to be the best cutters?"

- "Did you know that it takes 115 gallons of water to grow enough wheat for one loaf of bread?"

Then give any background information that you think would be helpful to your audience. Tell why your project is relevant. This could be the purpose of your project. State the title of your project. "The title of my project is . . . ." Follow with your hypothesis. "To test this hypothesis I... [state your procedure]." Follow the procedure with your observations and results, discussions of graphs and tables, and your conclusion.

At the end, you can state what you would do differently if you did the experiment again, what difficulties you encountered, and what additional research you could do to continue the project. You may then ask if there are any questions.

To beef up your presentation, talk about what you discovered in your research. Make it relevant to your project. If your topic has been previously studied, give the results of the previous research. This outline is just a sample. Tailor it to your needs and make it interesting.

You are the expert on your topic. Be confident!

Science Fair Displays

What is the purpose of the backboard? It tells the following:

- What is the title of the student's research?
- What did the student researcher want to discover? (the problem, the hypothesis)
- How did the researcher do it? (the materials, the procedure)
- What did the researcher discover? (data, graphs, observations and results, conclusion)

Backboards should tell a story, be neatly arranges, have attractive lettering and coloring, and be easy to read. Clutter and/or disorganized displays detract form the student's work.

REQUIREMENT: THE ABSTRACT MUST BE POSTED ON THE BACKBOARD ON THE LOWER LEFT SIDE!

Size requirements (maximum):

- 48 inches wide
- 30 inches deep
- 8 feet from floor

You can purchase a backboard from Wal-Mart, School Stuff, an office supply store, or a craft store. Some places (like School Stuff) also sell title headers and labels.

SAMPLE LAYOUT: People generally read left to right

Top—Title (may be in center)
Left side—Problem, Hypothesis, ABSTRACT MUST BE HERE
Center—Materials, Procedure, Pictures, Data, Graphs
Left side—Observations and Results, Conclusion

IDEAS FOR ENHANCING YOUR DISPLAY:

- Spray paint your backboard or purchase a board that is already colored.
- Use decorative border.
- Mount your information on foam board and colored paper.
- Use fabric, wallpaper, or other paper to cover your backboard.

REMEMBER . . . first impressions are often lasting ones for the judges!

Have fun being creative!

If you have any questions about your display board please feel free to call Bob Johns at 549-8024.

Research Plan

Required for all students going to regionals.
It must be attached to form 1A

Student Name(s)

A. Problem
B. Hypothesis
C. Procedure (Human research or hazardous materials must include special information—see Mrs. Johns for list)
D. Bibliography—must include at least 5 major references

THE BIBLIOGRAPHY MUST INCLUDE THE ISEF RULES.

EXAMPLE:

International Rules for Precollege Science research: Guidelines for Science and Engineering Fairs, 2009. Intel ISEF SRC, Science and Education Department, Washington, DC.