Chapter 5: Beginning Your Written Report

I have set up my experiment and I am running the trials. What else should I be doing while I am collecting data?

Now that you have begun running the trials of your experiment you can start to think about your written report.
Remember that the written report is a summary of everything you did to investigate your selected topic. It contains all the information you learned while completing your project. Because you have done an experiment, the written report is also where you share your experimental question, your hypothesis, the procedures you followed and the results you gathered. The written report provides you with the opportunity to think about what you have learned and to share this knowledge with others.

Although you are still running your experiment you can begin working on putting together your written report.

Continue reading to find out more about the sections that will be part of your written report!

The following information will give you some basic requirements for your report, as well as the order that each section will appear in the report.

Instructions for Written Reports Experiments

- All reports should be typed and double-spaced.
- The margins need to be between 1—1 ½ inches.
- Use a standard font that is easy to read. The font size for all text should be between 12 –14. Headings can be done in a larger font size.
- Print all text (except for headings and graphs) in black ink.
- Your written report should be a minimum of four pages (not including the title page, works cited page and acknowledgements page.)
- Be sure to use a heading for each new section of your report.
- Follow directions carefully or you will lose points!
- When your report is due remember to turn in your checklist.

Listed below are the instructions for each section of your written report. Be sure to follow the instructions carefully! The sections in your report should be in the same order as they are listed here.

1st TITLE PAGE

The title page should be on a separate page. It includes the title of your project and your number (given to you in class).
NO NAMES should appear on your title page or in your report!

If you choose you might also include a picture or a graphic on your title page. (This is not required!)

2nd TABLE OF CONTENTS

The table of contents should be on a separate page.
Be sure to start the page by typing the heading "Table of Contents".

This page provides the reader with list of the different sections of your report and lists the page number on which each section starts.

3RD PURPOSE

Start your purpose on a separate page from the table of contents.
Be sure to first type the heading "purpose".

The purpose is a short paragraph explaining why you chose this topic and what you hoped to learn by investigating this topic.

If you have chosen to do the same or a similar experiment from a previous science fair, you can mention in the purpose why you have chosen to repeat the experiment.

4th LITERATURE REVIEW

This part of your report does not have to be on a separate page. You can simply skip a few spaces after the purpose and then start the literature review.

Be sure to start this section by typing the heading "Literature Review"

All of your research should be summarized and presented in this section. It should be written in your own words! Don't copy information directly from a source.

Be sure to organize this information in some way. Remember this is where you show the judges the quality of the research you've completed and what you know about your topic!

*****THE LITERATURE REVIEW SHOULD BE ABOUT 2 PAGES TYPED & DOUBLE-SPACED!**

5th EXPERIMENTAL QUESTION

Start this section with the heading Experimental Question/Problem State the question/problem you were trying to answer by doing your experiment.

6th HYPOTHESIS

This is where you write your educated guess about what you thought would occur during and after your experiment. Your results may be different from your hypothesis. This is okay!!!! Don't change your hypothesis. Keep the same hypothesis from the beginning to the end of the experiment.

Be sure to start this section with the heading "hypothesis".

7th MATERIALS AND EQUIPMENT LIST

Begin this section with the heading "materials and equipment list".

List all of the materials and equipment that were used in the experiment. This section does not need to be in complete sentences!

List only the materials used in your experiment.

DO NOT list materials used for your display board!!!

8th EXPERIMENTAL PROCEDURE

Start this section with the heading "experimental procedure".

In this section of your report you should list and describe the steps you took to complete your experiment. Usually the procedure is presented in a numbered format.

This part of the report would allow someone to recreate your experiment and run it exactly as you did.

BE VERY SPECIFIC AND EXACT!!!

9TH OBSERVATIONS AND RESULTS

Be sure to start this section with the heading "observations and results".

Show all of the data you collected during your experiment. This section is where you show the judges the results of your experiment.

You can display your data in a variety of ways including: charts, graphs, pictographs, lists etc…

BE SURE TO LABEL ALL GRAPHS AND CHARTS!!

10TH CONCLUSION

Be sure to begin this section with the heading "conclusion".

Restate your hypothesis and tell whether or not your results proved or disproved your hypothesis.

Try to come up with explanations for why events occurred during the experiment. Using the word because is a good way to turn an observation (something you saw) into a conclusion (a reason why something happened).

Tell the judges what you have learned from doing this experiment.

Also tell the judges what you would change if you were to do this experiment again, or what you would do to continue this experiment.

11th WORKS CITED PAGE

The works cited page should be on a separate page with the heading "works cited" at the top.

This is the alphabetical listing of all of the resources you used to write your literature review section of your written report.

Use the instructions given to you!

12th ACKNOWLEDGEMENTS

This section should be on a separate page with the heading "acknowledgements" at the top.

In this section you thank anyone who helped you with your science fair project.
Be sure to thank anyone you interviewed and any businesses who may have donated materials or helped you to get supplies.

Be sure to remember to include a thank you to your parents!

Chapter 6: The Display Board

When do I start thinking about my display board?

While you are continuing to run the trials of your experiment and you are finishing your research and working on the rough draft of your written report you need should begin thinking about your display board.

The display board forms the background for your science fair project.
It is where you will display sections from your written report that highlight the steps in completing the experiment. The display board is also a place to show your results.

Display boards can be purchased at office supply and craft stores.

The standard size is 36" by 48". Display boards are available that are thin and economical (corrugated cardboard) to thicker and more expensive (foam board). A variety of colors are available.

Your display board should be no wider than 48" so that it will fit on the table. It should be able to stand on its own without any other support. Poster board does not make a good display board because it is too flimsy to support any weight.

Does the order I place information on my display board matter?

Yes, you should follow a standard format like the one listed below. This helps the judges find the sections they may be looking for.

Format For Display Boards For Experiments

On the left panel you should place the following sections:

1. Problem
2. Hypothesis
3. Procedure

On the center panel you should place the following sections:

1. Title of your experiment. (You can use a header board for the title if you choose.)
2. Your number (the one you use in science class).
3. Grade level
4. Observations/Results include graphs, charts etc… showing the results of your experiment.

On the right panel you should place the following sections:

1. Conclusions
2. What would you change if you did the experiment again? (You can use the title Next Time for this portion.)

It is up to you to decide what (if anything) you will put in any remaining space left on your display board.

Helpful Hints When Creating Your Display Board

1. THE TITLE
   - Your title should be neat and large enough to read from about three feet away.
   - A shorter title is more attractive and draws more attention.
   - Use about six to ten words with a maximum of about fifty letters.

- You can use precut letters or make your own out of construction paper. You might also stencil the lettering directly onto the display board.
- Before you glue your letters down, be sure that they are straight and neatly arranged.

2. DISPLAY MATERIALS
   - For those of you who have done a research project you will want to arrange to have display materials on the table in front of your display board. If you have done an experiment you may choose to have display materials on the table but they are not required.
   - Be sure that display materials don't block the judges view of your display board!

3. HEADINGS AND TYPED MATERIAL
   - Place all typed material on a colored backing, such as construction paper or card stock. If your display board is colored you might decide to skip this step!
   - Leave a colored border around the edge of each piece of white paper.
   - Use a paper cutter or a ruler so the edges are straight.
   - Make the headings and title stand out by using larger letters.
   - When you come to set up your display at the science fair be sure to bring an emergency repair kit that contains extra letters, glue, the colored paper you used, markers etc… This way you can make last minute repairs in case something is damaged or falls off.

4. MISCELLANEOUS TIPS
   - Use computer generated graphs when possible. If you have to hand draw a graph be sure to use a ruler, and make sure it is done neatly.
   - Label all parts of your graphs!
   - Display photos that show the procedure you followed and/or your results.
   - Limit the number of colors you use on your display board.
   - Attach all items neatly. If you have many pieces of paper, place them one on top of the other so that the top paper can be lifted to reveal the ones underneath.
   - Balance the arrangement of items on your board. Distribute them evenly so that the items cover about the same amount of space on each side of your display.
   - Use rubber cement, a glue stick or double-sided tape to attach the papers to your board. ***WHITE SCHOOL GLUE LEAVES WRINKLES!!!
   - Don't leave large, empty, white spaces on your board.
   - If you have exhibit materials on the table be sure that they don't block the judges view of your display board.
   - Make the title and headings eye catching and easy to read.
   - Make sure that folders that are attached to your board don't fall open.
   - Have a place on your display board (a folder, pocket, envelope etc…) in which you can place your written report.
   - Make sure that everything is spelled correctly.

If you are including exhibit materials on the table in front of your display board, read the suggestions below.

Remember Safety First!

In order to keep everyone safe, do not use the following items as part of your exhibit materials in front of your board.

1. Open microbe or bacteria cultures.
2. Fungi that is not sealed in a container.
3. Strong chemicals (anything that can burn the skin).
4. Batteries that are cut open.
5. Materials that are highly flammable.
6. Aerosol cans of household cleaners or other substances.
7. Medications
8. Anything poisonous
9. Sharp items such as knives, scalpels, scissors etc…
10. Breakable containers

YOU SHOULD NEVER INCLUDE LIVE ANIMALS AS PART OF YOUR DISPLAY!!!

If your research project topic was an animal you should include pictures of the animal. No live animals are permitted at science fairs! There may be people who are allergic to them. It is also very stressful for an animal to be on display!

Chapter 7: The End is Near
Finishing Your Project

I've been running my experiment for several weeks and I've collected lots of data. What should I do now?

Congratulations! You are almost finished with your science fair project!
It is time to share your results and make conclusions.

Now that you have reached the end of your experiment, it is time for you to look at the results you've collected and decide how you are going to present them in your written report and on your display board.

FIRST:

Take the raw data you've collected during your experiment and perform any math needed to turn the data into numbers that you can use to make tables charts or graphs.
If you have a lot of data it is a good idea to calculate the averages.

SECOND:

Decide how best to share your results. Ask yourself would my data be better presented in a table? A chart? A graph? What type of graph would be best?

Some hints on graphs:

1. A bar graph is used when you have numerical data and a variable that is described rather than measured. A bar graph shows comparison between things.
2. A line graph is the graph that is used most often by scientists. It is used when all of your variables involve numbers. A line graph shows change.
3. A pie graph or chart is best used when you have data that is represented by percentages.
4. When you display your results on a graph usually the independent variable (what you changed or tested) goes across the bottom on the X axis. The dependent variable (what you measured) usually goes up the Y axis on the side.

THIRD:

Once you have chosen the best way to display your data, you can begin creating the graphs or charts.
It is best to use a computer when possible.

If you have to handwrite your tables, charts or graphs be sure to do so neatly and use graph paper when necessary.

Make sure that all parts of your graph are labeled and that you have given the graph a title. Use color when possible!

FOURTH:

Now that you've created graphs, tables or charts to display your results, you need to look over them carefully.

Check all of your charts or graphs for the following things:

- Make sure that you typed or wrote the data in the graph correctly.

- Decide if you should include a written description of your results along with the graphs, charts or tables.

- ***EVERYTHING SHOULD BE CLEARLY LABELED.***
  Be sure that every graph has a title and that all parts of the graph have labels. If you've created a key make sure that it is understandable and easy to read.

What should I write for my conclusion?

After you have finished creating your graphs, charts or tables, it is time to write your conclusion. This is where you assess the results or data that you gathered during the experiment. You try to decide if you found an answer to your original question or problem. You tell if you proved or disproved your hypothesis. You try to give a scientific explanation for what happened in your experiment.

Here are a few items you should mention in your conclusion:

1. If you disproved your hypothesis, what might be the possible answer to your experimental question.

2. Be sure to summarize any problems that you experienced while completing your experiment.

3. Are there changes that you think you should have made to your experimental procedure?

4. What would you do differently if you did the same experiment again?

5. Describe what you learned from the data you collected.

6. If the results do not support your original hypothesis, give reasons why you think this happened.

7. If your results are inconclusive and you cannot prove or disprove your hypothesis state this in the conclusion!

8. Be sure to restate your hypothesis and tell if it has been proved or disproved.

Read this example of a conclusion for the experimental question "Does different colored light affect plant growth?"

Sample Conclusion

My experiment focused on testing the effect of different colored light on plant growth. My hypothesis was that the white light would

Chapter 8 Writing The Works Cited Page

The information on the following pages was adapted from MLA Handbook for Writers of Research Papers Sixth Edition by Joseph Gibaldi.

After you have finished your report it is time to write your works cited page. Use the information on your works cited cards or note sheets to write your works cited page. Be sure that you follow the directions below carefully! Set up your references exactly the same way as the examples.

For A Book by a Single Author:

1. Author's full name (last name [comma] first name followed by a period.)
2. Full title (Underlined and followed by a period).
3. City of publication (Followed by a colon).
4. Publishers name (Followed by a comma).
5. Year of publication/copyright date (Followed by a period).

Example:
Avraham, Regina. The Circulatory System. New York: Chelsea House, 1989.

For A Book by Two or More Authors:

1. First Author listed (last name [comma], first name followed by a comma)
2. Then list the name of the second author in normal form (first name and last name).
3. Place a period after the last authors name.
4. Follow steps 2-5 from book by a single author to finish the reference listing!

***If the book has more than three authors you may name only the first author (last name first) and then add the words *et al.* which means "and others".

Example:
Smith, Suzanne, and Diane Shade. Frogs in Their Natural Habitat. London: Oxford Publishing, 1997.

OR

Silverstein, Alvin, et al. The Circulatory System. New York: Twenty-First Century Books, 1994.

For an Article In A Magazine or Newspaper:

1. Author's name (Last name [comma], First name followed by a period.)
2. Title of the article (in quotation marks followed by a period)
3. Title of the magazine or newspaper (Underlined)
4. Date of publication (List day, month abbreviation and then year followed by a colon.)
5. Page numbers of the article (followed by a period)

Examples:

Hittner, Patricia. "Women and Heart Disease." Better Homes and Gardens June 1992: 55-57.

Jaroff, Leon. "The Biggest Killer—Heart Disease." Time 9 Nov. 1992: 72-73

For An Internet Source:

1. Author's name if known (last name [comma], first name followed by a period).
2. Title of the document (in quotation marks followed by a period).
3. Title of the site, project, or database (underlined and followed by a period).
4. Name of the organization or institution sponsoring the site, if it is known (followed by a period.)
5. Date when you accessed the source (Month abbreviation and year followed by a period).
6. Network address or URL (place in arrow brackets < > followed by a period)

Example:

Jones, James. "Heart & Stroke A-Z". Home Health & Family. Feb. 2006. <http://www.womenshealth.org>.

For An Interview:

1. List the name of the person interviewed (last name [comma] first name followed by a period.)
2. List the kind of interview *personal interview, telephone interview, e-mail interview* (followed by a period).
3. List the date or dates of the interview (day, month abbreviation and year followed by a period.)

Example: Scheib, Ronald. Telephone Interview. 6 Feb. 2006.

Important Information About Your Works Cited Page

- If no author is listed you can use the editor's name instead. If there is no editor then begin your reference with the title of the work. Be sure to place it in alphabetical order with the other references on your works cited page.

- If you have used other sources such as television shows, sound recordings, maps etc… see your teacher to find out how to list them on the works cited page.

- Be sure to start your works cited page with the heading **Works Cited** centered at the top.

- If your reference goes onto a second line, make sure you indent the second line five spaces. Look at the example below.

Hittner, Patricia. "Women and Heart Disease." Better Homes and Gardens June 1992: 55-57.

- Do not use short form dates such as 1/9/94. Write it out 9 Jan. 1994.

- Double space between each new reference. Use a single space if the same reference goes onto a second line, and don't forget to indent!

- Print your works cited page in plain font, black ink and a standard font size between 12 and 14.

- Remember the works cited page should be on a separate page.

- **PAY ATTENTION TO THE PUNCTUATION AND FORMAT USED IN THE EXAMPLES IN THIS CHAPTER!**

Sample Works Cited Page

Avraham, Regina. The Circulatory System. New York: Chelsea House, 1989.

Hittner, Patricia. "Women and Heart Disease." Better Homes and Gardens June 1992: 55-57.

Jaroff, Leon. "The Biggest Killer—Heart Disease." Time 9 Nov. 1992: 72-73.

Jones, James. "Heart & Stroke A-Z". Home Health & Family. Feb. 2006. <http://www.womenshealth.org>.

Scheib, Ronald. Telephone Interview. 6 Feb. 2006.

Silverstein, Alvin, et al. The Circulatory System. New York: Twenty-First Century Books, 1994.

Smith, Suzanne, and Diane Shade. The Effect of Heart Disease on Society. London: Oxford Publishing, 1997.