

# Scientific Method

## • Step 6 •

### Present Your Ideas





"The pure magnitude of such a copious assertion is far too sagacious for my diminutive comprehension. It is merely corroborative detail intended to give artistic verisimilitude to an otherwise bald and unconvincing narrative."

• Geoff Nielson

## **Objectives of This Section**

This is where all the hard work pays off. We are going to assume that you not only have to do an experiment but also prepare a report, a display, and present the project orally.

\_\_\_ 1. Prepare a thorough lab write-up. Start with the abstract and wind up with a glossary at the end with all the trimmings.

\_\_\_ 2. Create a visual presentation of your project. Use this display to accompany your oral presentation and also present it as part of the Science Fair.

\_\_\_ 3. Outline an oral presentation of your project and give it to your class in the allotted amount of time.

## True Bravery

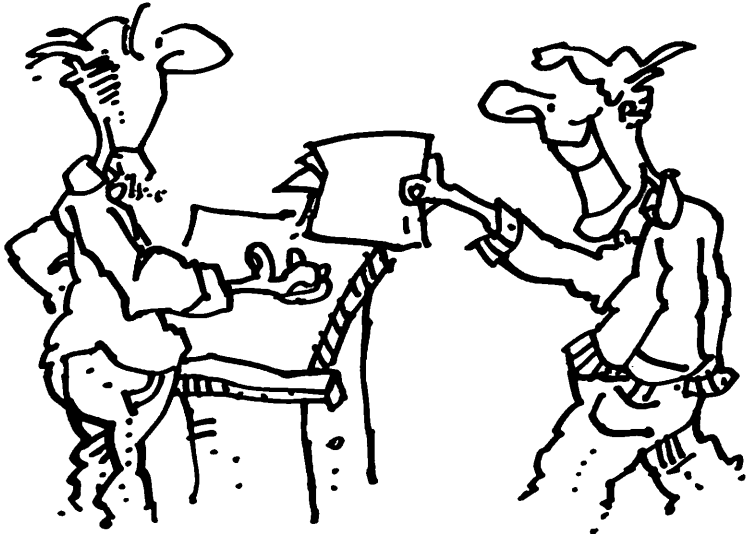
A young man sat down to take his college philosophy final. When he opened the cover of the exam, the question "What is courage?" stared back from the top of the page at him.

He thought for a moment and then wrote two words, "This is." He then turned his exam in, much to the amazement of his peers, after only using three minutes of the allotted two hours, and walked out the door of the lecture hall.

Not only should you dare to be creative in producing original ideas, but also you should strive to make original presentations of the data that is recovered. Hopefully, you have a teacher who would be willing to throw her entire grading system out the window if a student shows remarkable originality in the presentation of his or her ideas.

Then again, you may be sitting in the class of an old fuddy-duddy and anything original scares the pee waddlings out of him. Guess you have one last, little bit of research to do. What kind of teacher do you have?

By the way, the kid got an A.



# Written Report Checklist

First up is the written report, also called your lab write-up. After you compile or sort the data you have collected during the experiment and evaluate the results, you will be able to come to a conclusion about your hypothesis. Remember, disproving an idea is as valuable as proving it.

This sheet is designed to help you write up your science fair project and present your data in an organized manner. This is a final checklist for you.

To prepare your write-up, your science fair report should include the following components:

- \_\_\_\_\_ a. binder
- \_\_\_\_\_ b. cover page, title, & your name
- \_\_\_\_\_ c. abstract (one paragraph summary)
- \_\_\_\_\_ d. table of contents with page numbers
- \_\_\_\_\_ e. hypothesis or question
- \_\_\_\_\_ f. background information
  - concepts
  - word definitions
  - history or scientists
- \_\_\_\_\_ g. list of materials used
- \_\_\_\_\_ h. experimental procedure
  - written description
  - photo or drawing of setup
- \_\_\_\_\_ i. data collected
  - data tables
  - graphs
  - photos or drawings
- \_\_\_\_\_ j. conclusions and findings
- \_\_\_\_\_ k. glossary of terms
- \_\_\_\_\_ l. references

The outlines on the following pages will make sure that you don't leave anything out in the final report.

## The Abstract

The abstract is a one paragraph summary of your project. It is used by scientists doing research to quickly review a paper and decide if it has any information in it that will help them with their research. It is also used by librarians and other people who catalog and store information so that they can classify your work and place it with other similar kinds of papers.

Your abstract needs to meet the following criteria:

- No longer than one paragraph
- States your question
- States your conclusion

Rough draft: \_\_\_\_\_

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Be sure to have at least two people proofread your final abstract. Copy or type your final version on a separate, clean sheet of white paper to be included in your report.

## The Table of Contents

The Table of Contents is actually one of the last things you want to put together on your report. Gather all of the components up, arrange them, number the pages and then fill in the space to the right.

You may choose to personalize the categories that we listed below to make them more specific to your project. For example, instead of "concepts" you may want to list "principles of aerodynamics," if your report is on flight. Also, the titles from the data tables and graphs you created should be used.

<b>Section Heading</b>	<b>Page #</b>
cover page, title, & your name	___
abstract (one paragraph summary)	___
table of contents with page numbers	___
hypothesis or question	___
background information	
concepts	___
word definitions	___
history or scientists	___
list of materials used	___
experimental procedure	
written description	___
photo or drawing of setup	___
data collected	
data tables	___
graphs	___
photos or drawings	___
conclusions and findings	___
glossary of terms	___
references	___

## Hypothesis

Now is not the time to change this piece of work. Put the title, Hypothesis, at the top of the page and then refer to page 35 in this book. Be sure to have at least two people proofread your final draft. When it is clean and ready to go, your final version should be presented on a separate, clean sheet of white paper to be included in your report.

## Background Information

### **1. Concepts, History and/or Scientists**

Refer to page 50 for review. On a separate sheet of paper, write the law(s) or concept(s) as it/they appear(s) in the book, encyclopedia, or journal that you are using. Enclose the concept in quotes and list your source of this information immediately afterward. Include title, author, and page number.

On a separate sheet of paper, you may want to include either some background information about the evolution of your idea or a very brief synopsis of a famous scientist who may have contributed significantly. For example, if you are doing a project on electric motors, then Michael Faraday would be a logical reference. If you are working with solar cells, no one scientist stands out, but there is a very clear history of how these have evolved over the years.

Write the scientist's name or topic in capital letters. Write one or two brief paragraphs. Include title, author, and page number of any books that you used for reference.

### **2. Word definitions**

Refer to page 51 for review. On a separate sheet of paper, write the vocabulary words as they appear in the glossary, encyclopedia, or dictionary that you are using. The definition of the word should immediately follow the word. List your source of this information immediately afterward. Include title and page number of the reference you are using.

## Materials

Refer to pages 60 and 61 in this book and be sure to have at least two people proofread your final draft. When it is ready to go, your final list of materials should be presented on a separate, clean sheet of white paper to be included in your report. Sound familiar?

Put the title, *Materials*, at the top of the page and then list all of the items that you used and the quantities in the order that you used them.

Quantity	Items
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

## Experimental Procedure

You will, first of all, want to produce the original procedure that you proposed and used. Each step of the procedure should have its own number. If you followed the procedure exactly as you wrote it, great. However, a lot of kids find that once they get into the project they couldn't foresee all of the glitches, bumps in the road, and problems that would arise.

A good final procedure will show:

- a. where changes had to be made,
- b. why they had to be made,
- c. and how they influenced the evaluation of the hypothesis and its acceptance or rejection.

## Data collected

1. Data tables. These should be inserted in the final draft where they are appropriate to explain the conclusions. This can be a separate section after the Experimental Procedure or incorporated as part of the Conclusions. They need to have a title, variable with unit, constant with unit, the data, and be presented in a very neat and orderly manner. You should always print your data tables if you are doing them by hand or use a computer. Draw lines with a ruler, or again, use a computer.

2. Graphs should immediately follow the data tables. The title, variable with unit, constant with unit, and the data should be identical to the information in the data table. The graphs are also to be presented in a neat and orderly manner. You should always print your information if you are doing it by hand or use a computer. Draw lines with a ruler, or again, use a computer.

3. Photos and drawings must have labels (titles) and show scale so the reader can get a sense of proportion. Use a border to define your picture and draw in ink whenever possible.

4. Notes should be taken in neat, legible hand writing. If they are taken in the field and you are running from the volcano as it is exploding and showering you with molten debris, then retype or copy the notes when you get to a more relaxed setting. However, be sure to include the original set of notes.

5. Sound recordings, videotapes, and MP3's should be clearly labeled. If an audio tape is recorded, a typed transcript of the information that you collected should also be included in your data section.

## CONCLUSIONS & Findings

Begin by making a definitive statement about your hypothesis. I was/was not able to support my hypothesis. Then you are going to want to explain, using the guide sheets that were provided on pages 85 and 86 to assist you.