How to Write a Science Research Paper

Writing a science research paper can be a little different from writing a paper for an English class. Use this guide to help you on structuring and organizing your research and data into a report. Make sure you check out example papers on the KJAS website!

Title

A one-sentence description of the paper. The title should be an attention-getter in the sense that once a reader sees it, they are pulled in through interest of the content. The title gives the reader a small taste of what the paper is about, the abstract is a sampler plate, and the paper is the full course meal.

A Comparison of Titles

You have completed research looking at plant growth under various soil conditions. In English class, you would be encouraged to give your paper a title that creates interest through mystery and intrigue. For example, the title could be “What Lies Beneath” or “The Grass is Always Greener.” With a scientific paper, it is better to give a title that gives the reader a good idea about the content: “A Soil Comparison in Promoting Fescue Grass Growth.”

Abstract

A summary of the paper. The abstract is not a trailer that leaves the reader with a cliffhanger, but it gives information on the problem, method, results, and conclusions—the whole project. The abstract should be about 200-300 words, or a decent paragraph.

Introduction

The background information and explanation of the problem. This is more than just a one-paragraph intro to a paper. This is where all of the hard sought-after research in developing the investigation is included in order to bring the reader up to speed with what is being tested and why. The introduction is basically a paper by itself and includes the Investigative Question and Investigation/Hypothesis (many statistical analyses require the use of a hypothesis).
Materials & Methods

A detailed recap of the testing procedures. This isn’t a cookie recipe for someone to follow, but an explanation of what all was done in the experimental process. However, it should have all details included (specific materials and any special tricks used) for another person to duplicate the experiment. This section should be written in paragraph form, not a procedural list.

Results

All data and observations—expected and not. Report everything! Even if a test had to be redone, still report the initial results and why it was restarted. The charts and graphs will come in handy for this section to give a visual representation of the results. The results should be related in paragraph form (but include data tables, charts, and graphs) and should be kept separate from the conclusion by not analyzing the value or significance of the results.

Conclusion

Analysis of the results. Now is the time to reflect over the whole experiment and explain how the results relate to the original Investigative Question. In order to determine whether the results show any significance or correlation, a statistical analysis is required. Unexpected results or difficulties should be discussed, and additional research may be needed to explain such issues. Evaluating the process and design of the experiment is an important part of the conclusion in determining what else can be done to give more helpful or definitive results. The conclusion will most likely be more than one paragraph.

Testing for Significance

Just completing research and compiling data is not enough to convince a scientist on whether that data has any meaning or not. This is when statistical analysis comes into play. Choosing the calculations to use for your research can be difficult, so follow the links below for more info on statistics and how to use them.

- Science Buddies on using Data Analysis:
  http://www.sciencebuddies.org/science-fair-projects/top_research-project_data-analysis.shtml
- Khan Academy tutorials for Statistics and Probability:
  http://www.khanacademy.org/math/probability/statistics-inferential
- Quantitative Methods on determining Deviations, Correlations, and Significance:
  http://researchrundowns.wordpress.com/quantitative-methods/

References

The listing of all sources cited. The sources must be credible with science journals and book publications being amongst the most suitable. Wikipedia is not considered a refutable source, but you can use it to find other sources through the references listed at the end of each page.

Check out the Kansas Junior Academy of Science website for more resources!
webs.wichita.edu/kjas