

GUIDELINES FOR PREPARING A RESEARCH REPORT

The following information on report writing and format is provided to be helpful to undergraduate researchers and to faculty advisors. This report must be a well-written and comprehensive research report of no more than ten double-spaced pages (12 pt font, 1" margins). The page limit includes all figures and tables. Most scientific research reports parallel the method of scientific reasoning. That is: the problem is defined, a hypothesis is created, experiments are devised to test the hypothesis, experiments are conducted, and conclusions are drawn.

- Title
- Abstract
- Introduction
- Experimental Details or Theoretical Analysis
- Results
- Discussion
- Conclusions and Summary
- References

TITLE & TITLE PAGE

The title should reflect the content and emphasis of the project described in the report. It should be as short as possible and include essential key words.

The author's name (e.g., Mary B. Chung) should follow the title on a separate line, followed by the author's affiliation (e.g., Department of Chemistry, Central State College, Central, Arkansas, 67123), the date, and the origin of the report (e.g., In fulfillment of a Chem 395/396 Research Project under the supervision of Professor Philip Needlenose, May, 2002).

Acknowledgements and a table of contents can be added as preface pages.

ABSTRACT

The abstract should, in the briefest terms possible, describe the topic, the scope, the principal findings, and the conclusions. It should be written last to reflect accurately the content of the report. The length of abstracts varies but seldom exceeds 200 words.

A primary objective of an abstract is to communicate to the reader the essence of the paper. Were the report to appear in the primary literature, the abstract would serve as a key source of indexing terms and key words to be used in information retrieval.

INTRODUCTION

“A good introduction is a clear statement of the problem or project and why you are studying it.” (**The ACS Style Guide**. *American Chemical Society*, Washington, DC, 1986.)

The nature of the problem and why it is of interest should be conveyed in the opening paragraphs. This section should describe clearly but briefly the background information on the problem, what has been done before (with proper literature citations), and the objectives of the current project. A clear relationship between the current project and the scope and limitations of earlier work should be made so that the reasons for the project and the approach used will be understood.

EXPERIMENTAL DETAILS

This section should describe what was actually done. It is a succinct exposition of the laboratory notebook, describing procedures, techniques, instrumentation, special precautions, and so on. It should be sufficiently detailed that other experienced researchers would be able to repeat the work and obtain comparable results.

If the experimental section is lengthy and detailed, as in synthetic work, it can be placed at the end of the report or as an appendix so that it does not interrupt the conceptual flow of the report. Its placement will depend on the nature of the project and the discretion of the writer.

RESULTS

In this section, relevant data, observations, and findings are summarized. Tabulation of data, equations, charts, and figures can be used effectively to present results clearly and concisely. Schemes to show reaction sequences may be used here or elsewhere in the report.

DISCUSSION

The crux of the report is the analysis and interpretation of the results. What do the results mean? How do they relate to the objectives of the project? To what extent have they resolved the problem? Because the “Results” and “Discussion” sections are interrelated, they can often be combined as one section.

CONCLUSIONS AND SUMMARY

A separate section outlining the main conclusions of the project is appropriate if conclusions have not already been stated in the “Discussion” section. Directions for future work are also suitably expressed here.

A lengthy report, or one in which the findings are complex, usually benefits from a paragraph summarizing the main features of the report – the objectives, the findings, and the conclusions.

The last paragraph of text in manuscripts prepared for publication is customarily dedicated to acknowledgments. However, there is no rule about this, and research reports frequently place acknowledgments following the title page.

REFERENCES

Literature references should be collated at the end of the report and cited in one of the formats described in **The ACS Style Guide** or *JACS*. Do not mix formats. All references should be checked against the original literature.

TWO USEFUL TEXTS

Writing the Laboratory Notebook, Kanare, Howard M., *American Chemical Society*, Washington, DC, 1985. This book describes among other things the reasons for note keeping, organizing and writing the notebook with examples, and provides photographs from laboratory notebooks of famous scientists.

The ACS Style Guide, Dodd, J. S., Ed; *American Chemical Society*, Washington, DC, 1997. This volume is an invaluable writer’s handbook in the field of chemistry. It contains a wealth of data on preparing any type of scientific report and is useful for both students and professional chemists.