GUIDELINES FOR WRITING THE THESIS OR DISSERTATION
READ THIS ENTIRE DOCUMENT BEFORE STARTING!!

Go to Dr. Wilson and check out The ACS Style Guide (2nd edition, 1997) and A Manual for Writers of Term Papers, Theses and Dissertations by Kate L. Turabian (1996). See example pages in the Dept. of Chemistry Guidelines (this document). Also check the web page for the Graduate office to obtain the guide published by the graduate office. There is a check list that must be submitted with each thesis and dissertation (see the graduate studies web page, choose the “style other than APA”.

Students should plan to get the theses or dissertations in final form to Dr. Wilson no later than the date listed due to the number of theses being submitted. Any thesis having too many format, grammar or other errors will be returned unread. When the thesis or dissertation is submitted to Dr. Wilson, it should be edited and corrected to the point it is ready for the Graduate office and all committee members should be ready to sign it. You may, however, bring it to Dr. Wilson for a quick look at format prior to this time. Dr. Wilson and Dr. Pearson will not function as copy editors! Adequate time should be allowed for each reading of the thesis/dissertation. Each reader has a busy schedule so it will be necessary to allow 1-2 weeks for reading each revision.

***The first three dates for major professor are suggestions as reasonable guidelines. Student and major professor should work out that part of the schedule but if these dates are not followed approximately, there will not be sufficient time.***

Schedule for Fall 2004 (approximate schedule)
First draft due to major professor June 24
Second draft due to major professor Aug 5
Third draft due to major professor Aug 17
Corrected thesis due to second reader or committee members Aug 31
Thesis due to Dr. Wilson Sept 13
Thesis due to Dr. Pearson Sept 27
Thesis due in Graduate office (there WILL be NO extensions) October 11

Schedule for Spring 2005 (approximate)
First draft due to major professor Dec 2
Second draft due to major professor Jan 13
Third draft due to major professor Jan 27
Corrected thesis due to second reader or committee members Feb 2
Thesis due to Dr. Wilson Feb 16
Thesis due to Dr. Pearson March 2
Thesis due in Graduate office (there WILL be NO extensions) March 19

Schedule for Summer 2005 (approximate)
First draft due to major professor Feb 23
Second draft due to major professor Apr 4
Third draft due to major professor Apr 18
Corrected thesis due to second reader or committee members May 2
Thesis due to Dr. Wilson May 16
Thesis due to Dr. Pearson May 30
Thesis due in Graduate office (there WILL be NO extensions) June 10
I. Overview of the process:

With your major professor, pick a topic. Go to the formal scientific literature (journals, not textbooks or the Internet) to see what has already been done in the area. Perhaps others have done similar studies that you can use as a source of ideas. After one has done a thorough literature review and feels that he/she knows about all the work done previously, then one can narrow the focus of the current project. One should determine what is to be done and how it is to be done. A research plan is developed. Doctoral students with an education based research project should have already taken SPSE 7010, Educational Research Methodology. One should realize that research seldom goes perfectly as planned. But the research plan gives a starting place and a guideline for the early work. Subsequent developments may necessitate a modification of the original plan. That is why they call it research.

The student should begin writing the thesis as soon as possible. Chapter 1, Introduction (including the literature review with copies of the references) should be submitted to the major professor early in the research project. Chapter 2, Methods and Materials, can be written during the project as well. It is not a good idea to save writing until after all the research is completed. There is not sufficient time to do a good job.

Writing a thesis or dissertation is an evolutionary process. It takes several revisions. This involves passing it back and forth between student and major professor a minimum of three or four times before submitting it to the other committee members. Each committee member may have more recommendations for revisions as well. The student should not treat the committee members as copy editors, making only the changes that they suggest. The student should be proactive in making his/her thesis the best possible. The committee members should receive the revised dissertation a minimum of 2 weeks before the Defense of Dissertation is scheduled. At the defense, the dissertation is orally presented formally to the committee and other interested parties. The student is prepared to defend his/her work as well as his/her chemistry and education background/knowledge at this time. The committee may have further revisions. If the work is acceptable, the revised dissertation is then submitted to the Department Chair who may have further revisions. These revisions are made and the newly revised dissertation is submitted to the Dean of Graduate Studies. He/she may have further recommendations for revisions. After the Graduate Dean accepts it, the student submits the appropriate number of copies, which are then sent by the Graduate School to be bound. One copy of the dissertation (not MS theses) goes to Dissertation Abstracts who publishes an abstract and makes copies of the dissertation available to anyone who wishes a copy. The dissertation is thus available for widespread dissemination and permanent record.

II. Literature Review and Research Methods

Once a research project is selected in consultation with the major professor, a thorough literature review is made to assess the current state of research related to that project. Once it is determined what other workers have done, a specific project is outlined. One of the purposes of writing a thesis or dissertation is to demonstrate that the student can review pertinent technical literature, assimilate the contents, write a clear, concise summary of what was read, and present it at a level that a chemist who is not a specialist in the field can understand. The student is expected to review the literature to find all studies that give the background work for the current project. In other words, the student is to find out what has been done, what remains to be done, and the relationship of prior work to the current project. One may cite review articles and monographs for broad, general concepts but citations of individual experiments, data or other such specific information should be drawn from the primary literature (journal articles). If we...
use a review article or book, we are getting what that author SAYS appeared in another article. That author may have made a mistake or misinterpreted the other article or given a wrong citation or the information may be incomplete. Therefore, one must go to the primary source in order not to perpetuate errors. The original author must always be given credit for his/her work. The student must avoid plagiarism. He/she must read articles (not just the abstract!) and then summarize the findings in his/her own words—not using the wording and phraseology of the original author and limiting the use of direct quotes. The student must reference all work that is referred to. See article on plagiarism at the end of this guide.

Whether a chemistry bench-research project or an education-based-research project, it must have good research design. Prior planning prevents poor performance (P5). In an education-based project it is especially important to have the whole project well defined at the outset. One must know what data is to be collected, what questions are to be asked and answered and how the data is to be evaluated before one begins to collect the data.

A lab notebook is maintained and a copy is given to the major professor. All methods and specific conditions as well as data are conscientiously recorded in it. Sources for the methodology is recorded in the notebook. Great care is taken to insure that what is recorded is true and accurate. One does not want to be accused of falsifying data--this can (and has!) lead to the degree being revoked even years later! In developing the method, the procedure for standard preparation and standardization of methods should be included. The methods should be standardized and the student should develop expertise in reproducibility BEFORE an attempt at data collection is made. The method should be tested on known samples and expertise in the methodology developed BEFORE final data collection takes place. Duplicates of the samples should be analyzed and evaluated just after the methodology is standardized in order to detect any problems in the analysis. If there are difficulties, these should be worked out or the project modified (with appropriate literature review) if necessary. Data collection from real samples should not proceed unless there is a reasonable expectation that the analysis will produce valid results. Attention to proper standards, blanks, etc is essential and must be done at the beginning of the project, not as an afterthought. In the final data collection, multiple aliquots of each sample must be analyzed and the reproducibility of the method evaluated. An organic synthesis project should include sufficient repeats of the synthesis to demonstrate that the synthetic method is reproducible. Any project should be designed with the appropriate attention to standardization, reproducibility and proper research design.

III. Organization of Chapters:

Chapter 1 in the ACS Style Guide gives advice on writing a scientific paper and tells what appears in each section. For bench work based theses and dissertations, the chapters should be similar to the following. Chapter 1, Introduction, containing the literature review that lays the groundwork for the project and a concise statement of the project (ie. briefly, what you intend to do and how you intend to do it). Chapter 2, Methods and Materials (or Experimental) describes the methods and all materials in a way such that a reader may reproduce the work. Chapter 3, Results and Discussion (these may be presented in separate chapters if desired). Chapter 4, Conclusions (summarize conclusions and include suggestions for further research). The chapter titles can be altered to fit projects that have different needs (check with major professor and Dr. Wilson). A standard education dissertation has five chapters: Chapter 1,
Introduction, is a stage setting chapter where the purposes of the study or importance of the study is discussed in context...in other words what is the purpose of the project and how did it develop? Chapter 2, Literature Review, is a review of the relevant literature on the topic such that the investigator demonstrates a good understanding of what has already been done in related areas. Chapter 3, Methods, is usually a bit more complicated than a bench top experiment. Chapter 4, Results or Results and Discussion, depends upon the type of investigation. Chapter 5, Discussion or Conclusions, a discussion of the results and what may be concluded. It usually includes implications and ideas for further research. The standard format and chapter titles can be altered to fit the design of a particular study (check with major professor and Dr. Wilson).

IV. Style of Presentation:

The most recent edition of *The ACS Style Guide* (2nd edition, 1997) and any guide published by the graduate office must be used. The current edition for *The ACS Style Guide* should be followed for all chemistry-related technicalities. Where the technicality relates to a thesis/dissertation style and not to a published article, the style guide *A Manual for Writers of Term Papers, Theses and Dissertations* by Kate L. Turabian (1996), should be consulted. In addition, *The Harbrace College Handbook* and a good dictionary are also necessary. The work must be written in clear, concise scientific style, avoiding the use of superfluous words. The work MUST be correct in grammar and punctuation. The thesis must conform to graduate school and departmental guidelines for style of presentation. The style of presentation must be CONSISTENT throughout.

A few of the major guidelines are:

1. **Font:** 12-point type required for all text including captions of figures and tables, Times New Roman or similar standard font preferred (no script fonts). The text is double-spaced except where noted below. Single-space items in a list but double-space between items. Manual corrections (correction tape, correction fluid, insertions, or strikeovers) may not be made on the final copy. Indent paragraphs consistently (0.5 inches--use tabs).

2. **Margins:** left margin 1.5 inch with the remaining margins 1 inch. The student may make a clear plastic template with these margins marked on it. The template can then be used to easily check that each page meets the margin requirements. All text, figures, and tables and appendices must conform to these margins. It is preferred that the right margin not be justified. (See “TIPS” on page 9) Set margins: Top 1.35, bottom .92, left 1.5, right 1.0.

3. **References:** The references must follow *The ACS Style Guide* (chapter 6). The references are cited sequentially in the text and indicated by a superscripted number. References are numbered in the sequence that they first appear in the text and listed in that sequence on a page titled References. (The ACS style guide also provides for the citation by author name and date. This style may be used if the majority of publications in that discipline use it.) The references are double-spaced. Where an entry extends over more than one line, subsequent lines of that entry must be single-spaced. One may cite review articles and monographs for broad, general concepts but citations of individual experiments, data or other such specific information should be drawn from the primary literature (journal articles). If we use a review article or book, we are
getting what that author SAYS appeared in another article. That author may have made a mistake or misinterpreted the other article or given a wrong citation or the information may be incomplete. Therefore, one must go to the primary source in order not to perpetuate errors. *The original author must always be given credit for his/her work.*

4. **Figures:** Figures must be publication quality, using publication quality font. Figures are numbered sequentially (1, 2, 3, etc.) in the order that they first appear in the text. **Figures and tables larger than ~0.5 page should appear on a page by themselves and not incorporated in the text.** The captions are placed a double space (12 points before) beneath the figure (for very large figures the caption may appear on a separate page facing the figure). Figure captions are typed lower case, single-spaced and flush left and may be a phrase if short, or a complete sentence if longer. If the figure caption is very short, it may be centered beneath the figure. *The figure caption should contain sufficient information such that the reader does not have to refer to the text in order to understand what the writer wants to convey.* It should contain the legend and any conditions, etc. Similar figures should have similar figure captions. All graphic illustrations, charts, graphs, diagrams, maps, photographs, and plates should be listed as "Figures". Figures incorporated in the text should be preceded and the caption followed by 3 blank lines (put 24 points below the preceeding text and above the following paragraph)--be consistent. Figures and Tables inserted in the text should, if possible, immediately follow the paragraph in which they are first mentioned. If they will not fit on that page, the text is continued and they start at the top of the next page. Figures and tables at the top of a page should appear at the same line as a line of normal text. Figures and tables should be centered between the left and right margins. Figures or tables reproduced from the literature must have a letter of permission for use (included in the appendix).

5. **Tables:** Tables are numbered sequentially (1, 2, 3, etc.) in the order that they first appear in the text. A title is given at the top of the table, centered (other styles may be used, if used consistently--see Turabian). *See page 300-303 in ACS Style Guide for guidelines on tables. For sample tables see page 254, 282 in ACS Style Guide and p 263-269 in Turabian.* Tables should appear on a page separate from the text or, if incorporated in the text, should immediately follow the paragraph in which they are referenced or, if there is insufficient room on that page, the text is continued and they start at the top of the next page. Tables incorporated in the text should be preceded and followed by 3 blank lines (put 24 points below the preceeding text and above the following paragraph)--be consistent. Figures and tables at the top of a page should appear at the same line as a line of normal text. The table should appear a double space below the title. Figures and tables should be centered between the left and right margins. Figures and tables larger than about 0.5 page should appear on a page by themselves and not incorporated in the text. Some information should be either unnumbered lists (page 303 ACS style guide) or put in narrative form in the text. See p 300-303 in the ACS style guide for what is an appropriate table. **USE TABS to set up appropriate spacing--not spaces.**

6. Both **tables and figures** must immediately follow the page in which they are first referenced in the text. *In the text, they are not merely pointed out but are discussed in detail, telling the reader...
what is in the figure or table, what is to be learned from the figure or table, etc. Explain clearly, do not leave it up to the reader to interpret the data.

7. **Page numbers:** The first page of a chapter is numbered but the number not shown. In the body of the text, the page numbers will appear 1 inch from the top edge of the page and 1 inch from the right edge of the page. The first line of text will appear two lines below the page number. Figures and tables will likewise appear at least two lines below the page number. See also Item 11. The front matter is numbered ii, iii, iv, etc. and the number is centered at the bottom of the page one inch from the bottom. (Put the front matter and each chapter in separate files to facilitate page numbering.)

8. When just one line of a paragraph appears at the top of a page, one should go to the previous page and force a page break so that at least two lines of a paragraph appear at the top of a page. (When this is done it is OK if the previous page has a bottom margin that is one line (no more) wider than the others.) Likewise, one must not have just one line of a paragraph at the bottom of a page (push it to the next page, which leaves the bottom margin on the first page one line wider). WORD will take care of this unless you have an intervening figure, table or page break.

9. **Spacing:** The text is double-spaced. Put 48 points before Chapter Titles. Triple space below chapter titles (or leave it double space and put 12 points after). For side headings: triple space above (or leave double space and put 12 points before) and double space after.

10. **Headings:** Side headings longer than two-thirds of a line should be divided in two and single-spaced (both lines flush left). Side headings use headline style of capitalization (capitalize all words except articles, prepositions, coordinating conjunctions, etc.) Be consistent in all spacing. Use as few levels of headings as possible. First level of side heading: Bold, headline style. Second level: Italics, not bold. Third level: plain text. Do not use indented side headings. Do not use centered headings other than the chapter title. The heading title appears on its own line, do not continue the text on the same line as the heading. (See above for spacing before heading).

11. **The sequence of pages** for the front matter is given in the graduate school thesis checklist (Graduate Studies Web Page --Journals or Style Manuals Other than APA--checklist). In order are the approval page, title page, acknowledgements (if any), abstract (max: 350 words for dissertations, 150 words thesis), table of contents, list of tables, list of figures, body of paper, references, separation page titled Appendixes, appendices, IRB Approval form (when applicable), permission letters for use of copyrighted materials (where applicable). The title page is not numbered but is understood to be page i. The acknowledgements page and following pages are numbered (ii, iii, iv, etc) centered at the bottom (1 inch from the bottom edge of the page). To facilitate page numbering, it is recommended that each chapter and section of the thesis be placed in a separate file.
12. The title for chapter pages, the front matter pages and the references page start ~2 inches below the top edge of the paper and are written in all caps, bold, and centered (with exceptions for special notation). (Paragraph format 48 points before) CHAPTER 1 (double-space) TITLE IN ALL CAPS (triple-space) then text.

13. Table of contents: Titles of all major divisions are written in all caps (ACKNOWLEDGEMENTS, TABLE OF CONTENTS, LIST OF FIGURES, LIST OF TABLES, CHAPTERS, etc) sub headings use headline style (capitalize the first letter of all words except articles, prepositions, coordinating conjunctions, etc.). Page numbers are aligned right--use a right tab with a leader…. (Format--Tabs). Table of contents, list of tables, list of figures and references are double-spaced except individual entries are single-spaced. An individual entry must not be split across two pages. All entries must appear exactly as in the text. (The first sentence of a figure caption may be used.) The second page of a Table of Contents or List of Figures, etc. starts at the same line as a regular text page. Use tabs (not spaces) to align the components of these pages.

14. In methods and materials, the quality and source of all chemicals and other materials is stated. For example: Hexanes (pesticide grade, Fisher Scientific, Pittsburgh, PA), gas chromatograph/mass selective detector (model 6890N/5973, Agilent, Palo Alto, CA)

15. For the list of tables, list of figures, references and any other numbered lists, the numbers should be aligned on the periods. (See the method to align references given in the handout “Some tips for setting up Microsoft Word”). Page numbers given in these lists must be right aligned. To align page numbers use a right tab and a leader (Format--Tabs)

16. Once all signatures are made on the signature page, copies must be made and a copy that includes all signatures (including the Graduate Dean) must be included with every copy of the thesis turned in to the graduate office for binding.

17. Use archive quality paper (Xerox paper is often yellowish and turns yellow easily). If you are using color figures then make sure the type paper you use takes color well.

V. These are some things with which previous students have had problems, check to see if you have the same problems:

The bottom margin is 1 inch. The only extra white space that should appear at the bottom of text pages should be at the end of the chapter. No extra space between paragraphs. Only one extra blank line may be left at the bottom of a page in order to prevent having only one line of a paragraph at the top of the next page.

Any figures or tables reproduced from the literature must have a permission form granting permission from the copyright owner and the source cited in the caption to the figure or footnote to the table.

et al. is not italicized and is not preceded by a comma.
A heading near the bottom of a page must have at least 2 lines of text beneath it. A paragraph must have at least 2 lines on a page.

**Periods at the end of sentences are followed by two spaces. Colons are followed by one space.**

Is the phraseology concise? Eliminate excess verbiage that does not lead to a clear understanding of what is being said. Read the material very carefully--make sure the wording conveys the exact meaning that is intended. Make sure there is agreement in tense. You are writing up what has been done. Use past tense.

Make sure your conclusions are supported by the data you collected not by what you wanted to happen.

Check to make sure the table of contents page numbers, and heading wording (and that of the list of figures and list of tables) exactly match that of the text. (Figure captions may be shortened to the first sentence if it is different from all other figure captions). Table titles and figure captions are not bold.

For the list of tables, list of figures, references and any other numbered lists, the numbers should be aligned on the periods. (See the method to align references given in the section “Some tips for setting up Microsoft Word”). Page numbers must be right aligned. To align page numbers use a right tab and a leader (Format--Tabs)

Use abbreviations (see ACS Style guide p 162) mL, °C, μL. Leave a space between number and unit: 35 mL. See p 143-144 in the ACS style guide for proper use of numerals and units and abbreviations.

It is best not to refer to page numbers in the text (we forget to change them when the page numbers change).

Check ACS style guide page 173-175 for the proper use of authors names in the text.

Check for correct spacing before and after headings, figures and tables.

When aligning, use tabs--not spaces!!

Avoid the use of lists, except where necessary to improve clarity.

Bold all titles and chapter headings.

Take great care to see that the references follow ACS guidelines exactly.

Check the bottoms of all pages to make sure that there are no blank lines and that there is no more than one line left blank when necessary to put at least 2 lines of a paragraph on a page.
When you use a series of references break them up if appropriate. For example: …analysis of metals, pesticides, and soil.\textsuperscript{32,33,34,35} might more properly be shown as …analysis of metals.\textsuperscript{32} pesticides, \textsuperscript{33,34} and soil.\textsuperscript{35} \textit{The reference number usually goes outside the punctuation.}

In the References, all volume numbers should be italics and all pagination should be inclusive.

Use the same spacing above and below all Equations or sets of equations. (Triple space above and below--be consistent.)

Long chemical names, when necessary, are hyphenated in order to prevent a long blank space at the end of a line. (See page 239 in the ACS style guide)

In the list of references, the books should have the pages listed too. (ACS Style Guide p 187).

There should be consistent spacing between title and the table (one blank line between them). All footnotes to tables should have consistent spacing (one blank line between it and the table). One blank line should go between the figure and caption--put 12 points before the caption.

When there is a list of items, single space each item with a double space between items. For smaller lists, remove the numbers and put them in series in the text.

The reference numbers are either superscripted or placed in parentheses in italics on the same line as the text.

Check \textit{each} final copy to make sure that no pages are missing or out of order and there are no spots, specks or blurred type. Also, check to see that margins are still correct--photocopying sometimes enlarges the text (perhaps copy at 98%). Before submitting the thesis or dissertation, use a clear, plastic template to check that all pages follow the margin requirements.

Check the final page numbers in the Table of Contents, List of Figures and List of Tables, etc to be certain that the page numbers match those in the text.

Check to see that \textit{all} pages are in the correct order (front matter and numbered pages). Remember Murphy's Law!
Some tips on the basic setup of Microsoft Word (other word processing programs should be similar).

**NOTE:** Always format your document using the computer (IBM or Mac) and the exact printer (under Print-Setup) that you will use to print your document. Setting up with one printer and then printing on another printer WILL change margins, etc. that cannot be remedied. After you finish printing your document, use a ruler or clear template with the margins marked on it to check all pages to make sure margins are correct. You cannot depend on the word-processing program/printer to do it exactly right. (Remember that they do what we tell them to do, not necessarily what we want them to do).

If you have set up with another printer (or perhaps several printers), you will need to take special care in checking each section to make sure it is printing correctly. You may have to slightly adjust the margins in Page Setup to make the printer do what you want. I know it makes no sense but somehow formatting with one printer stores some commands that make it not come out right with the second printer--one of the great mysteries of the universe.

*Format, Font:* Times New Roman 12 pt

*Format, paragraph,* Line spacing: double space (to get triple space use spacing--multiple--3 or leave it double space and put 12 points before or after a paragraph).

*File, Page Setup, Margins:* (For regular text pages):

- **Right margin** 1.0 inches
- **Left margin** 1.5 inches (you *may* have to adjust this a little i.e. 1.52" for some printers)
- **Top margin** 1.35 inches (for chapter title pages, put 48 points “before” the chapter to put the title at ~2") --you *may* have to adjust the top margin a little to allow the last line of the page to be at the one inch mark. It is important that it be consistent throughout the thesis or dissertation.
- **Bottom margin** 0.92 inches but measure the printed page to see that the text is still 1 inch from the bottom

**Header** 1.0 inches, with **page number right aligned in header** at the top line of header.

**Footer** 0 inches

*File, Page Setup, Margins:* (For the first page of Table of Contents, list of tables, list of figures)

- **Right margin** 1.0 inches
- **Left margin** 1.5 inches (you *may* have to adjust this a little i.e. 1.52" for some printers)
- **Top margin** 1.35" and have 48 points before the title to put the title at ~2"--you *may* have to adjust the top or bottom margin a little to allow the last line of the page to be at the one inch mark.
- **Bottom margin** 0.92 inches.

**Header** 0 inches

**Footer** 1.0 inches, with **page number centered in footer**

For Table of Contents, list of tables, list of figures, etc.

*Format, Tabs, Tab stops* at: (more may be added if necessary)

- 0.5 inches, (left aligned), 1.0 inches, (left aligned), 1.5 inches (left aligned) (others can be added at 0.5 inch increments) 6.0 inches, (right aligned) This will put the page numbers correctly aligned at the right margin. The "Leader" will be either "none" (for those lines without a leader)
or "………" (for those lines with a page number). Just tab over, enter the page number and the leader will be displayed preceding the page number. This value will need to be changed manually depending on the display desired.

**References** are single-spaced within an entry and double-spaced between entries.

**References:** Highlight the individual entry. Format Paragraph and have hanging indent .5" (you may need to adjust this to fit your printer) in order to make the second line align with the text of the first line of the entry (see example below).

**To align the numbers:** Highlight all entries and set two tabs .25" with right alignment and .31" with left alignment. Tab then type the number followed by a period then tab and start typing the reference. (The entry won’t look right until you start typing the text of the reference--then it will look fine).

**REFERENCES**


For most pages, the bottom line of text should be sitting on a mark 1 inch from the bottom of the page. Page numbers should be 1 inch from the left and 1 inch from the top of the page.

Note that copiers may not copy true to size. You should make a few pages of copy (on the machine that will make your final copies) and measure the margins to make sure the margin requirements are met. (you can adjust this by adjusting the % reduction or % enlargement of the copy.)

When you think that the style requirements are nitpicky, remember that we are the publishers for these books! We are responsible for making sure that they are in acceptable format.

**To the major professor and readers:**
**The student is responsible for insuring that the thesis or dissertation follows the style manual and that the grammar and punctuation is correct.** Since the major professor and readers are concurring that the science, grammar, and style is correct, they must read the thesis/dissertation **thoroughly** and inform the student of additional corrections both in science, style, grammar, and punctuation. By the time that the thesis is turned over to Dr. Wilson, it should be in final form with all errors corrected. If too many errors are noted, the thesis will be returned to the student unread, regardless of pending deadlines. Dr. Wilson and Dr. Pearson will not function as copy editors.
THE TITLE OF THE DISSERTATION GOES HERE IN ALL CAPS

AND MULTIPLE LINES SHOULD FORM AN INVERTED PYRAMID

by

Ima Verygood Student

Approved:

Dr. Herbert I. Jones, Major Professor

Dr. Imelda M. Hernando, Reader

Dr. Linda A. Wilson, Reader

Dr. Earl F. Pearson, Chair, Department of Chemistry

Dr. Robert F. Carlton, Interim Dean, College of Graduate Studies
ABSTRACT

THE TITLE OF THE DISSERTATION GOES HERE IN ALL CAPS

AND MULTIPLE LINES SHOULD FORM

AN INVERTED PYRAMID

Ima Verygood Student

The body of the abstract (150 word maximum for master's theses, 350 word maximum for doctoral dissertations)

See p 18-19 in the ACS Style Guide for what to include in the abstract. (method, results, conclusions)
TABLE OF CONTENTS

ACKNOWLEDGMENTS .................................................................................................. ii
ABSTRACT ....................................................................................................................... iii
LIST OF TABLES ............................................................................................................... v
LIST OF FIGURES ........................................................................................................ vii

CHAPTER

1. INTRODUCTION ........................................................................................................ 1

2. METHODS AND MATERIALS ............................................................................ 22
   Reagents and Materials ....................................................................................... 22
   Method Development and Standardization ...................................................... 24
   Sample Collection .............................................................................................. 29
   Sample Preparation ........................................................................................... 30
   Sample Analysis ................................................................................................. 33
   Data Analysis ..................................................................................................... 36

3. RESULTS AND DISCUSSION .............................................................................. 37
   Method Standardization .................................................................................... 37
   Data Analysis: Gas Chromatography ............................................................... 40
   Data Analysis: Gas Chromatography/Mass Spectrometry ......................... 54
   Pattern Recognition: Hierarchical Cluster Analysis .................................. 81
CHAPTER 4. CONCLUSIONS...............................................................................................................94
REFERENCES .....................................................................................................................................100
APPENDIXES ......................................................................................................................................104
# List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. THE COMPOSITION AND WEIGHT PERCENTAGE OF THE SAMPLES</td>
<td>30</td>
</tr>
<tr>
<td>2. INSTRUMENTAL PARAMETERS FOR THE GC/FID</td>
<td>34</td>
</tr>
<tr>
<td>3. INSTRUMENTAL PARAMETERS FOR THE GC/MS</td>
<td>38</td>
</tr>
<tr>
<td>4. COMPARISON OF SAMPLE I TO SAMPLE II USING PRINCIPAL COMPONENTS ANALYSIS</td>
<td>70</td>
</tr>
<tr>
<td>FIGURE</td>
<td>PAGE</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>1. Picture of the apparatus used for extraction of the samples</td>
<td>25</td>
</tr>
<tr>
<td>2. The derivitization reagents and sample derivative structures</td>
<td>26</td>
</tr>
<tr>
<td>3. Reaction mechanism of the derivitization of samples</td>
<td>27</td>
</tr>
<tr>
<td>4. Map of sampling locations</td>
<td>31</td>
</tr>
<tr>
<td>5. Gas chromatogram of the standard mixture</td>
<td>34</td>
</tr>
<tr>
<td>6. Mass spectrum of peak at RT 30.1 minutes</td>
<td>35</td>
</tr>
</tbody>
</table>
A research project is selected, and then a thorough literature review is made to assess the current state of research related to that project. Once it is determined what other workers have done, a specific project is outlined. One of the purposes of writing a thesis or dissertation is to demonstrate that the student can review pertinent technical literature, assimilate the contents and write a clear, concise summary of what was read. The student is expected to review the literature to find all studies that give the background work for the current project. In other words, the student is to find out what has been done, what remains to be done, and the relationship of prior work to the current project. The student must avoid plagiarism. He/she must read articles and then summarize the findings in his/her own words--not using the wording and phraseology of the original author and limiting the use of direct quotes. The student must reference all work that is referred to.

In developing the method, the need for standards and standardization of methods should be included. The methods should be standardized and the student should develop expertise in reproducibility BEFORE an attempt at data collection is made. The method should be tested on known samples and expertise in the methodology developed BEFORE final data collection takes place. Duplicates of the samples should be analyzed and evaluated just after the methodology is standardized in order to detect any problems.
in the analysis. If there are difficulties, these should be worked out or the project modified (with appropriate literature review) if necessary. Data collection from real samples should not proceed unless there is a reasonable expectation that the analysis will produce valid results. Attention to proper standards, blanks, etc is essential and must be done at the beginning of the project, not as an afterthought. In data collection, multiple aliquots of each sample must be analyzed and the reproducibility of the method evaluated. An organic synthesis project should include sufficient repeats of the synthesis to demonstrate that the synthetic method is reproducible. Any project should be designed with the appropriate attention to standardization and reproducibility.

For bench work based theses and dissertations the chapters should be: Chapter 1, Introduction (which contains the literature review and a concise statement of the project); Chapter 2, Methods and Materials (which describes the methods and all materials in a way such that a reader may reproduce the work—use complete sentences—give sources and quality); Chapter 3, Results and Discussion (these may be presented in separate chapters if desired); Chapter 4, Conclusions. The standard format can be altered to fit projects that have different needs. A standard education dissertation has five chapters: Chapter 1 is a stage setting chapter where the purposes of the study or importance of the study is discussed in context...in other words what is the purpose of the project and how did it develop? Chapter 2 is a review of relevant literature on the topic so that the
investigator demonstrates a good understanding of what has already been done in the related areas. Chapter 3 is the methods.

Figure 1. A chromatogram of one derivatized skin oil sample. Each peak represents one or more chemical components of the skin oil sample. The height of the peak corresponds to the relative amount of the component present.
### TABLE 2
TENNESSEE MOUND LIPID CONTENT AVERAGES  (mg lipid/g dry ant)

<table>
<thead>
<tr>
<th>SITE</th>
<th>SPECIES</th>
<th>AUTUMN</th>
<th>WINTER</th>
<th>SPRING</th>
<th>SUMMER</th>
<th>AVERAGE</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>S. invicta</td>
<td>244</td>
<td>248</td>
<td>189</td>
<td>247</td>
<td>232</td>
</tr>
<tr>
<td>B</td>
<td>hybrid</td>
<td>316</td>
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<tr>
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<td>S. richteri</td>
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<td>184</td>
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<td>208</td>
<td>263</td>
</tr>
</tbody>
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1. Any notes to the table would go here.

*See the Turabian style guide for other examples of tables.*

*See next page for an example of a table incorporated in text.*
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Plagiarism:

What It is and How to Recognize and Avoid It

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What is Plagiarism and Why is it Important?

In college courses, we are continually engaged with other people's ideas: we read them in texts, hear them in lecture, discuss them in class, and incorporate them into our own writing. As a result, it is very important that we give credit where it is due. **Plagiarism is using others' ideas and words without clearly acknowledging the source of that information.**

How Can Students Avoid Plagiarism?

To avoid plagiarism, you must give credit whenever you use another person's idea, opinion, or theory; any facts, statistics, graphs, drawings--any pieces of information--that are not common knowledge; quotations of another person's actual spoken or written words; or paraphrase of another person's spoken or written words. These guidelines are taken from the Student Code of Rights, Responsibilities, and Conduct.

To help you recognize what plagiarism looks like and what strategies you can use to avoid it, move down to the appropriate topic.

How to Recognize Unacceptable and Acceptable Paraphrases

Here's the ORIGINAL text, from page 1 of *Lizzie Borden: A Case Book of Family and Crime in the 1890s* by Joyce Williams et al.:

The rise of industry, the growth of cities, and the expansion of the population were the three great developments of late nineteenth century American history. As new, larger, steam-powered factories became a feature of the American landscape in the East, they transformed farm hands into industrial laborers, and provided jobs for a rising tide of immigrants. With industry came urbanization the growth of large cities (like Fall River,
Massachusetts, where the Bordens lived) which became the centers of production as well as of commerce and trade.

Here's an UNACCEPTABLE paraphrase that is plagiarism:

The increase of industry, the growth of cities, and the explosion of the population were three large factors of nineteenth century America. As steam-driven companies became more visible in the eastern part of the country, they changed farm hands into factory workers and provided jobs for the large wave of immigrants. With industry came the growth of large cities like Fall River where the Bordens lived which turned into centers of commerce and trade as well as production.

What makes this passage plagiarism?

The preceding passage is considered plagiarism for two reasons:

--the writer has only changed around a few words and phrases, or changed the order of the original's sentences.
--the writer has failed to cite a source for any of the ideas or facts.

If you do either or both of these things, you are plagiarizing.
NOTE: This paragraph is also problematic because it changes the sense of several sentences (for example, "steam-driven companies" in sentence two misses the original's emphasis on factories).

Here's an ACCEPTABLE paraphrase:

Fall River, where the Borden family lived, was typical of northeastern industrial cities of the nineteenth century. Steam-powered production had shifted labor from agriculture to manufacturing, and as immigrants arrived in the US, they found work in these new factories. As a result, populations grew, and large urban areas arose. Fall River was one of these manufacturing and commercial centers (Williams 1).

Why is this passage acceptable?

This is acceptable paraphrasing because the writer:

--accurately relays the information in the original
--uses her own words.
--lets her reader know the source of her information.
Here's an example of quotation and paraphrase used together, which is also ACCEPTABLE:

Fall River, where the Borden family lived, was typical of northeastern industrial cities of the nineteenth century. As steam-powered production shifted labor from agriculture to manufacturing, the demand for workers "transformed farm hands into factory workers," and created jobs for immigrants. In turn, growing populations increased the size of urban areas. Fall River was one of these manufacturing hubs that were also "centers of commerce and trade" (Williams 1)

Why is this passage acceptable?

This is acceptable paraphrasing because the writer:

--records the information in the original passage accurately.
--gives credit for the ideas in this passage.
--indicated which part is taken directly from her source by putting the passage in quotation marks and citing the page number.

Note that if the writer had used these phrases or sentences in her own paper without putting quotation marks around them, she would be PLAGIARIZING. Using another person's phrases or sentences without putting quotation marks around them is considered plagiarism EVEN IF THE WRITER CITES IN HER OWN TEXT THE SOURCE OF THE PHRASES OR SENTENCES SHE HAS QUOTED.

**Plagiarism and the World Wide Web**

The World Wide Web has become a more popular source of information for student papers, and many questions have arisen about how to avoid plagiarizing these sources. In most cases, the same rules apply as to a printed source: when a writer must refer to ideas or quote from a WWW site, she must cite that source.

If a writer wants to use visual information from a WWW site, many of the same rules apply. Copying visual information or graphics from a WWW site (or from a printed source) is very similar to quoting information, and the source of the visual information or graphic must be cited. These rules also apply to other uses of textual or visual information from WWW sites; for example, if a student is constructing a web page as a class project, and copies graphics or visual information from other sites, she must also provide information about the source of this information. In this case, it might be a good idea to obtain permission from the WWW site's owner before using the graphics.
Strategies for Avoiding Plagiarism

1. Put in quotations everything that comes directly from the text especially when taking notes.

2. Paraphrase, but be sure you are not just rearranging or replacing a few words. Instead, read over what you want to paraphrase carefully; cover up the text with your hand, or close the text so you can't see any of it (and so aren't tempted to use the text as a "guide"). Write out the idea in your own words without peeking.

3. Check your paraphrase against the original text to be sure you have not accidentally used the same phrases or words, and that the information is accurate.

Terms You Need to Know (or What is Common Knowledge?)

Common knowledge: facts that can be found in numerous places and are likely to be known by a lot of people.

Example: John F. Kennedy was elected President of the United States in 1960.
This is generally known information. You do not need to document this fact. However, you must document facts that are not generally known and ideas that interpret facts.

Example: According the American Family Leave Coalition's new book, Family Issues and Congress, President Bush's relationship with Congress has hindered family leave legislation (6).

The idea that "Bush's relationship with Congress has hindered family leave legislation" is not a fact but an interpretation; consequently, you need to cite your source.

Quotation: using someone's words. When you quote, place the passage you are using in quotation marks, and document the source according to a standard documentation style.

The following example uses the Modern Language Association's style:
Example: According to Peter S. Pritchard in USA Today, "Public schools need reform but they're irreplaceable in teaching all the nation's young" (14).

Paraphrase: using someone's ideas, but putting them in your own words. This is probably the skill you will use most when incorporating sources into your writing. Although you use your own words to paraphrase, you must still acknowledge the source of the information.

Produced by Writing Tutorial Services, Indiana University, Bloomington, IN