

## Lab Report Guidelines

### Content of Lab Reports

Reports must be prepared on a word processor, such as *Microsoft Word*. *Weekly lab reports* must not exceed **6** doubled-spaced pages in length; *double lab reports* (reports that summarize two weeks' labs) must not exceed **7** double-spaced pages.

The standard format for writing a scientific paper is as follows:

- *Introduction*
- *Methods*
- *Data*
- *Interpretation*
- *Conclusions*
- *Reference Cited*

I expect that you will incorporate information from readings and from lecture material in the interpretation of your lab data, so be sure to read appropriate parts of your textbook and outside readings thoroughly before you write your lab report. ALWAYS, cite outside sources of information (including lab handouts) and include all citations in the section, entitled *References Cited*. Tables of data, all pertinent figures, and maps should be included in your weekly report *but do not count toward the page limit*. See requirements for Figures and Tables below.

The following are guidelines of what ought to be included in each of the report sections; reports must be formatted according to the guidelines below:

#### Introduction:

The *Introduction* introduces the reader to the topic of the paper and concisely *outlines the main objectives of the research*. This should be a maximum of 1/2 of a page for a 1 week lab; slightly more for multi-week lab reports.

#### Methods:

The *Methods* section should review the methods that you used and explain how you made your measurements *and* how you processed your data. This should *not* be written in list form; rather write this out as a series of coherent sentences and do not include overly obvious things like: "and then readings were entered into lab books". Use your own judgement here— a good rule of thumb: you want to make it easy for somebody to duplicate your study anywhere but nothing beyond that is needed. This section should be a maximum of 1/2 page for a 1 week lab; slightly more for multi-week lab reports.

#### Data:

The Data section should report observations *not* interpretations. In this section you will simply review the obvious trends in your data sets. For example, you could include the statement: *..the distribution of clay in soil #1 reveals a peak in the Bt horizon and a decline with depth into the C horizon*. This statement is simply a description of a trend in the data, it is not an interpretation of the data. You must cite all data tables and figures that summarize data in this section. This section should be a maximum of 1 page for a 1 week lab; somewhat more for multi-week lab reports.

#### Interpretation:

This section is where you will interpret your data sets and *should be the bulk of your paper*. What do the trends identified in the *Data* section suggest? For example, here you could include the statement... *the peak in clay content in the Bt horizon of soil #1 suggests that much of this clay is pedogenic*. You should attempt to explain all of the trends that you identified in the *Data* section. You may provide more than one possible interpretation of the data set and you should explain why one explanation is better than another. Cite all appropriate data tables and figures in this section. This section should be a maximum of 2 pages for a 1 week lab; somewhat more for multi-week lab reports.

### Conclusions:

In this section you will summarize all salient findings *and outstanding questions*, and make suggestions for future workers who might attempt to repeat this experiment. Do *not* present anything for the first time in this section. This section is meant to summarize all findings and enable a casually interested reader to get to the “bottom-line”. This section should be a maximum of 1/2 a page for a 1 week lab; somewhat more for multi-week lab reports.

### **Formatting Requirements**

Although we would all like to be able to write reports in whatever format we fancy, in the “real-world” reports, proposals, and etc. generally must follow strict formatting guidelines. This is especially true in the environmental field, where some of you may end up working.

To get you accustomed to formatting documents and to encourage you learn to use Word to a greater degree than you might otherwise, the following relatively simple formatting rules will apply to all written reports for this class.

### Basics:

- Font: Times, 12 point
- Margins: left=1.5”; all others= 1”
- Line Spacing= double (except as noted below)

### Text:

- your name, the date, and the title of each report will be **single spaced** in the upper left-hand corner of the first page
- the section titles of your report (e.g., Data, Interpretation) will be centered and in all caps
- paragraphs begin with a 0.5” tab
- a quadruple line space (i.e. 2 double spaces) will separate the end of one section and the title of the subsequent section
- all pages must be numbered in the lower center of the page EXCEPT the first page. Page numbers for figures and tables may be hand-written

Citing Published Work: All citations should follow the author, year format (see examples below).

1- Most citations should be in closed parentheses at the end of the sentence. For example:

*The stratigraphy, age, and origin of loess deposits in the Mississippi Valley have been the focus of considerable attention over the last century (e.g., Mabry, 1898; Leighton, 1931, 1965; Pye and Johnson, 1988; Forman and others, 1992a; Leigh, 1994). Early workers disputed the origin of these ubiquitous deposits, which mantle uplands and river terraces along the Mississippi Valley, and there have been proponents of fluvial, lacustrine, and colluvial origins (e.g., Russell, 1944 and references therein).*

\*note that only last names are used, no initials. In a string of citations such as follows the first sentence above, the list is organized **in order of publication date**.

\*when two authors are involved, both are listed, however when three or more exist the term *and others* or *et. al.* is used.

2- Occasionally you may need to cite a paper as part of your sentence. If so, use the following format:

*However, at least since the work of Leighton and Willman (1950), there has been little doubt that these deposits are primarily eolian and were derived from valley train deposits that emanated from the southern margin of the Laurentide Ice Sheet (LIS).*

\*note the difference between #1 and #2 above, especially with respect to the positioning of the parentheses

3- If you have more than one paper by the same author (s) in the same year, you will need to specify which is which by adding a suffix a, b, c, and etc. to the publication year. For example:

*In contrast, loess deposits in semi-arid regions such as the Snake River Plain (e.g., Forman, 1992a), the Colorado High Plains (Forman, 1992b; Madole, 1994), and the Argentine Pampas (e.g., Zárate and Blasi, 1993) may be ...*

\*be sure that in your References Cited section you also identify these papers by 1992a or 1992b, etc.

4- Verbatim quotations should be avoided in most cases; where they must be used, the page number of the source should be included. For example:

*The history of the use of cation-ratio dating is riddled in controversy, and according to Dorn (1990, p. 181) "workers cannot agree upon the definition, origin, and techniques for analysis of desert varnish".*

### References Cited-

Note the difference between a *Bibliography* and *References Cited*. The former is a comprehensive list of published work on a subject, whereas the latter lists just those papers that you cited in your paper. You all will have your references listed under a section entitled *References Cited* **Not** *Bibliography*!

All references will follow the Geological Society of America Format. All will be alphabetized according to the first author's last name. Note the different formats used by GSAB for papers, chapters, and books:

#### 1) Format For Citation Of Articles In Journals-

Balescu, S., and Lamothe, M., 1992, The blue emissions of K-feldspar coarse grains and its potential for overcoming TL age underestimates: *Quaternary Science Reviews*, v. 11, p. 45-51.

Bard, E., Hamelin, B., Fairbanks, R. G., and Zindler, A., 1990, Calibration of the <sup>14</sup>C timescale over the past 30,000 years using mass spectrometric U-Th ages from Barbados corals: *Nature*, v. 345, p. 405-410.

Begét, J. E., and Hawkins, D. B., 1989, Influence of orbital parameters on Pleistocene loess deposition in central Alaska: *Nature*, v. 337, p. 151-153.

Pye, K., and Johnson, R., 1988, Stratigraphy, geochemistry and thermoluminescence ages of lower Mississippi Valley loess: *Earth Surface Processes and Landforms*, v. 13, p. 103-124.

Royall, P. D., Delcourt, P. A., Delcourt, H. R., 1991, Late Quaternary paleoecology and paleoenvironments of the central Mississippi alluvial valley: *Geological Society of America Bulletin*, v. 103, p. 157-170.

#### 2) Format for books:

Aitken, M. J., 1985, *Thermoluminescence Dating*: New York, Academic Press, 359 p.

Birkeland, P. W., 1984, *Soils and Geomorphology*: New York, Oxford, 371 p.

#### 3) Format for citation of a chapter in a book edited by someone else:

Ruhe, R.V., 1983, Depositional environment of late Wisconsin loess in the midcontinental United States, in Porter, S.C. (ed.), *Late-Quaternary environments of the United States, volume 1, The late Pleistocene*: Minneapolis, Minn., University of Minnesota Press, p. 130-137.

**Figures-** You are required to use figures to illustrate your papers and to make your points clearer. Several rules apply:

- 1) figures must be cited in the text. If you do not refer to (i.e. cite) a figure in the text, the figure does not belong in the paper.
- 2) figures must be numbered consecutively in the order in which they are cited in the text
- 3) every figure must have a caption that tells the reader what is plotted and what the main point of the figure is. Figures should be independent of the text; that is, a reader *should* be able to comprehend a figure by reading the caption and studying the figure. Never use “*see text for explanation*” as a figure caption.
- 4) every figure must have a page number; these may be hand-written
- 5) At the end of your figure caption you should cite the source of your figure unless you made it yourself. For example:

*Figure 1. The relationship between drainage density and discharge for a small watershed in the central Appalachian Mountains (from Leopold and others, 1973).*

note that the term “from” in *from Leopold and others, 1973* (above) indicates that the figure is an exact reproduction of the figure in Leopold and others (1973). Alternatively, the term *after* is used to indicate that the figure has been modified from its original form, e.g., after Leopold and others 1973

- 6) if you cite the source of a figure, that source must be listed in your References Cited section
- 7) figures should be interspersed throughout the text as close as possible to the point at which they are first cited. Figures should share a page with text wherever possible.

**Tables:** A table is not a figure!! Tables contain data in rows and columns, whereas figures are graphs, plots, sketches, photographs, maps, etc. Do not confuse the two. In addition:

1. tables must be numbered consecutively in the order in which they are cited
2. must be placed at the very end of the report; after all figures
3. must be cited in the text (*see 1st comment on figures.*)
4. must have a caption at the top of the Table
5. must have a page number; these may be hand-written
6. all of the raw data must be included on a table(s) in your report

### **Final Tips**

- do not list procedures, interpretations, etc.; rather, summarize steps or points of discussion in series of coherent sentences
- each paragraph should begin with a topic sentence which serves to introduce the reader to the contents of the paragraph; if you find that the content of your paragraph is straying from the topic sentence, then it is time for a new paragraph (or a new topic sentence)
- I expect that you will incorporate information from background reading (textbook or provided by me) into your discussion
- use the spell-checker on Word and proof-read your report before handing it in.

### **Grades**

Reports will be graded equally for both content and style; maps will be handed in with each lab report and these will be graded for neatness, clarity and accuracy. This is a WAC 3 course and thus a major emphasis is placed upon improving writing skills. Pay attention to my editorial comments— *you will be penalized for making the same grammatical or stylistic errors repeatedly.*

*Only reports that are graded 8.0/10 or less in either content or style may be rewritten.*

**Due Dates**

Unless otherwise specified, lab reports are due one week after the scheduled lab. You will lose 10% of your grade for each day that a report is late. Thus, due dates are as follows:

<u>Report Number</u>	<u>Lab Weeks Reported</u>	<u>Due Date</u>
1	1	9/26/06
2	2	10/03/06
3/4	3,4	10/17/06
5	5	10/24/06
6	6	10/31/06
7	7	11/07/06
8/9	8, 9	11/14/06

**Use of Computers**

You will be required to use computers extensively in the preparation of your lab reports. In addition to WORD™ you may be required to use Microsoft EXCEL™, and SPHERISTAT™ for data processing and graphing. It is imperative that you back-up your work WEEKLY, and that you keep a back-up copy of all of your files in a safe place. Every term some unsuspecting student loses an entire lab due to a disc malfunction. Don't be the next one!!

**Collaboration**

You are encouraged to help one another to learn the software that we'll be using. *However*, each of you must *individually* make your own figures—no collaboration in figure making is permitted. Furthermore, any interpretation of these figures must be done individually.

**Academic Honesty**

Write everything in your own words; you must cite all sources of information; not doing so constitutes plagiarism and is a violation of the *Union College Statement of Academic Honesty*. This includes citing your textbook, any/all outside readings, and even your lab handouts. Although you may be collecting data and making figures and tables in teams, I expect that final interpretations, and all writing will be done individually. You are *not* permitted to read others' reports or discuss labs with students who have had the course in past years. I keep copies of all reports from previous years; anyone found guilty of academic dishonesty will fail this course. Students who become aware of the dishonest behavior of others are encouraged to report such behavior to me. Only in this way can academic integrity be maintained to the highest level.