

Guidelines for Field Trips and Reports

Equipment

- Waterproof field notebook (K & E, Rite-in-the Rain, etc.)
 - Pocket ruler (at least one edge in metric scale)
 - Mapping board or clipboard
 - Protractor
 - Pencils (several colors)
 - Compass with clinometer (provided)
- Clothing *Be prepared for soggy, possibly cold days.*
- Gloves - fingerless with polypro inserts are highly recommended for writing in the cold
 - Boots - highly recommended.
- Camping gear - will discuss closer to time of trips.
- Camping food - will discuss closer to time of trips.

Grades

Reports from labs and field exercises will be basis for evaluation for grades in this course. You will be evaluated on several criteria:

1. Field notebook. Turn in your notebook with your report. We will be evaluating the care with which you have recorded your observations. In particular, we will look for legibility, complete and coherent diagrams, maps, and overall organization, and content. The best way to think about this is to remember that these are the data upon which you and the class will rely. Be sure to write your name and address on the cover page. A brief description of the location of all field sites is highly recommended. Do your self a favor and number the pages and prepare and index for the contents.
2. Report. A typewritten report, not exceeding 4 typed pages (not counting figures or references) is required for each exercise. Even if more than 4 pages of text are included, only 4 pages will be read. The reports will be evaluated on the basis of content, organization, and quality of English (more on this below). Reference should be formatted according to the style used in either *Geology* or *Geological Society of America Bulletin*.
3. Calculations. These should be included as appendices to the report. They should be typed or carefully hand-written in ink. All calculations should state clearly the meaning of the numbers as well as show the dimensions and realistic significant figures.
4. Figures. All field reports must have a clearly labeled location map. All maps must have a title, scale, north arrow, complete legend, and caption. All other figures must have a title, adequate labeling, and a caption. All figures must be cited in the text. Uncited figures will be ignored.

How to write a Scientific Report

Preparation of a geologic report is not easy. The writer must describe the topic so that proper emphasis is placed upon significant aspects of the problem being addressed. Remember that your principal aim is to give any and all readers a vivid picture of the region or problem that you have studied, and that the reader is interested in obtaining this information with a *minimum expenditure of time and effort*. Whether the reader finds this task an easy one depends on the way you organize and write your report.

Advice as to how to write a scientific report can generally be divided into two categories:

First, the mechanical elements of report writing, such as rules of grammar and sentence structure, style, phrasing, *spelling*, and punctuation, are discussed and listed in various references: *Dictionary*, any number of English handbooks, *Suggestions to Authors* - USGS, *Elements of Style* - Strunk and White.

The second kind of advice is rarely offered in the required curriculum for geologists and other earth scientists. This fact is surprising, considering that most of the work in these sciences must be reported to the community in a written form. In this class there will be an emphasis on developing the writing and organizational skills required to produce coherent, informative, and useful written reports.

The following quote from Janovy (*On Becoming a Biologist*) considers one of the most common misconceptions about how to write a scientific report. "Furthermore, the manner in which biology (geology) papers are constructed is somewhat counter to the actual intellectual processes that occur when the research is planned and performed... papers are written according to this structure: introduction, methods, results, and discussion. If method, the headings would be: theoretical basis, hypotheses tested, hypotheses rejected and accepted, theoretical implications... The way we write about our work often hides the way we really do it." In other words, a scientific report is neither a chronological narrative of how the work was done, nor is it a display of all of the information and hypotheses considered during the study. Instead, it is a succinct and informative presentation of the important and critical data that were logically interpreted to either confirm or refute the several (or one) most plausible hypotheses that correspond to the problem/s addressed by the study. In order to produce such a distillation of the always huge pile of information, one must be extremely organized and focused when writing the report.

Suggested Format for Reports

As described in the previous section the most common organizational form of a scientific report is:

Introduction	or (for lawyers)	Issue
Methods		Rule
Results		Facts
Discussion		Analysis
Conclusions		Conclusion

This format can be applied to the entire report, each section of the report, and even to each paragraph. The purpose of and information that should be provided by each section are as follows.

Introduction. This section describes the context of the specific question addressed in the report. A better title for this section might be “Statement of the Problem” and you should think of it that way. Most commonly the introduction proceeds from a discussion of the large-scale problem to the small-scale, particular problem studied. A brief review of the methodology, critical data, and major hypothesis/es concludes the introduction section.

Methods. Methodology is described sufficiently so that measurements or experiments can be duplicated by the reader.

Results. Presentation of pertinent data in the form of graphs, figures, etc. with brief discussion to highlight significant data. Remember, these are the evidence you are using to prove to disprove the hypothesis/es described in the introduction. If they are not critical to your argument, don’t include them. (Put all your calculations in appendices for the class reports.)

Discussion. This section is the most important section and usually the most difficult to write. The purpose of this section is to show logically how the observations (results/data) that you have described can be interpreted in light of the question that is addressed in this report. Do these data refute or confirm your hypothesis and how can you prove it? The discussion section should be a logical and hierarchical presentation of your argument that proceeds clearly to your conclusion.

Conclusion. Reiteration of specific conclusions from study, and if appropriate, future work or broader implications.

Before you begin to write your report, make a complete outline. You will save a great deal of time, and your report will be organized. Make the outline complete enough so that you know what will be included in each paragraph. With the outline in hand, you will be ready to write.

Strive at the outset for a clear style, written in good grammar, but remember, NO AUTHOR WRITES THE FINAL DRAFT IN ONE DRAFT. Therefore, work over your original draft with these goals in mind:

1. Decreasing the total number of words, while striving for clarity.
2. Increasing the amount of information in the text.
3. Smoothing out the language - each section, paragraph, sentence, phrase, clause, and word should follow the last in logical and easy sequence.
4. Correcting your grammar and style - it is of utmost importance that errors of grammar, punctuation, spelling, sentence structure, redundancy, etc., be removed from the report and that style is consistent throughout the paper.
5. Verb tenses. Past tense should be used to describe the work that was done for the study, e.g., the sediment was weighed or the number was calculated... The present tense should be used to refer to actual data, e.g., the measured slope for April 16 is, and when referring to the work described in the literature, e.g., Walker and Cant (1984) show that...
6. Avoid using the passive voice. Please watch your verb tenses carefully.
7. Data are; datum is.

The report can follow the suggested format or another that you choose. However, if you choose another format make sure that it allows you to organize your report in an informative manner.

Finally, the report should include a title page with an appropriate title, the author's name, date, and class. The report should be fastened to a cover.

For further help with what you are actually learning in this class about scientific method and presentation of research refer to the following books or talk to the TA or instructors.

Beveridge, W.I.B., The Art of Scientific Investigation.

Day, R.A., How to Write and Publish a Scientific Paper.

Haines-Young, R. and Petch, J., Physical Geography: Its Nature and Methods.

Paltt, J. R. 1964, Strong Inference: Science, vol. 146, p. 347-353.