

Writing Plan for Geology Majors

**Submitted by Geology Faculty,
Oswego State University Of New York**

(Drs. S. Gabel, A. Isley, D. Thomas and D. Valentino)

Introduction

In March, 1997 SUNY Oswego's General Education Board established guidelines for the Writing Across the Curriculum (WAC) component of the General Education program. WAC requires all students to complete a basic composition course (or pass a competency test). All students who enter as freshmen also must complete five writing courses. Departments are required to develop a plan that describes how students in their majors would meet this five-course requirement. The Department of Earth Sciences administers two very different majors: meteorology and geology. Therefore, separate WAC plans are being developed. This document explains the requirements for students majoring in geology.

We offer B.S. and B.A. degree programs in geology from our department. Students can earn a B.A. or a B.S. in geology, or a B.S. in environmental geology. Students earning a B.S. in geology are required to take a 6-credit field course. Otherwise, the B.A. and B.S. tracks in geology are the same. Course requirements for the B.S. in environmental geology are quite different from those of the other tracks. Therefore, we have developed two different writing plans: one for students completing a B.A. or B.S. in geology, and one for those students majoring in environmental geology.

Goals

A major goal of our WAC plan is to foster our students' specific technical writing skills. Employers require geology graduates to be skilled in numerous types of technical writing, including technical reports, proposals, activity reports, memos, and other correspondence (Brown, et al., 1993). Our writing plan will train students in technical writing, thereby helping them succeed in a competitive job market.

The second primary goal of our plan is to use writing as a learning mechanism. Students will apply critical thinking skills, acquire more detailed knowledge about specific topics in geology, and demonstrate an understanding of course content through writing exercises, especially research papers. Research papers require students to critically evaluate past work on a problem in geology and, perhaps, to present their own findings. Many of our courses already have a term paper requirement, and in some courses this component will be added.

Geologists are trained to use specific techniques to collect and analyze data. They must then interpret the data and communicate their findings to a variety of different audiences, such as the scientific community, management, clients, and sometimes the general public. Our plan requires that students be able to present their findings in technical reports. Some courses also require students to tailor their writing to a specific audience, especially the non-technical audience. We will emphasize the importance of "writing for your audience, not for yourself" in these courses.

Objectives

A. Behavior

As indicated above, there are numerous types of writing experiences students will have in the geology writing program. In several courses, students will be required to write a research paper. Most papers will primarily be reviews of the literature on a particular topic in geology. The research paper is a vehicle for students to learn how to conduct library research, deepen their knowledge base in a particular aspect of geology, and evaluate the work of others in the context of basic principles the student has learned. These skills are especially important for students who will go on to graduate school and conduct research themselves, but the skills are required of all geologists.

Our *Geowriting* course (GEO 390) is specifically intended to enhance our students' skills in written communication. In *Geowriting*, students are required to produce several types of technical writing, such as a proposal, a progress report, a process or methods description, a literature review, a technical report, a memo, or a cover letter and resume.

Others of our courses listed below emphasize written communication. For example, in the *Surface Water Hydrology* course (GEO 335), students must carry out a class research project as well as an individual research project. These involve data collection in the field, laboratory work, data analysis, and data interpretation. Students must write a research proposal, progress report, and a final technical report. Students complete similar research projects in *Petrology* (GEO 440) and *Chemical Oceanography* (OCE 375). While such courses are not required of all students, we consider these electives to meet both campus-wide goals, and those specific to our department.

Further, geology students are required to take several lab courses. We also have courses that do not have a separate lab period, but still require students to do practical exercises similar to lab exercises. Some of these courses require extensive writing. Students engage in several "writing to learn" activities, including describing experimental or field (data collection) procedures, taking field notes, describing analytical techniques and calculations, presenting their interpretations of results, and writing succinct conclusions. Our students will use these writing skills throughout their professional careers.

Finally, essay examinations are given in many courses. Students are required to make logical arguments supported by evidence, examples and scientific principles. These are important tests of the student's writing ability.

B. Conditions

In our writing courses, students are given explicit instructions for writing assignments. For courses that require research papers, students are provided with style sheets that indicate how to present figures, tables, citations, bibliography entries, and other technical aspects of such papers. Students are required to read many examples of scientific papers that serve as models for organization, style and sound reasoning. Students are provided with the grading rubric that will be used to evaluate their papers (see Attachment). This rubric always includes substantial consideration of grammar, punctuation, organization and clarity. In several courses, students are provided with an example of a bad paper or essay and are asked to correct mechanical errors in order to demonstrate the need for careful proofreading.

Most geology courses require term papers. Writing such papers trains students to use library resources and improves their writing skills. Early in their course of study, geology majors take GEO 200, *Historical Geology*, which has a term paper requirement. In GEO 200 students typically spend one session in the library with a librarian who helps them learn how to identify paper topics and shows them how to access available resources. In several courses (e.g., GEO 300, *Environmental Geology* and GEO 330, *Structural Geology*), instructors require that students submit a term paper topic, preliminary reference list and abstract or outline *before* the writing begins. We make a concerted effort to return term papers to students before a semester's end, with corrections and a grading sheet. This allows students the time to meet with us in a one-on-one session to see how they could improve their writing skills.

Laboratory and in-class exercises contain detailed instructions regarding what students must address in their written reports. In some courses, such as *Hydrogeology* (GEO 430) and *Surface Water Hydrology* (GEO 335), students are given a style sheet on the first day of the course that indicates how written work should be submitted. In *Geowriting* (GEO 390), students are required to purchase a technical writing textbook and are encouraged to purchase a manual of style.

C. Criteria

For all courses we include below that meet WAC standards, all student writing assignments are reviewed by the instructor. Correct grammar, punctuation, sentence construction, and spelling are required and the instructor marks mistakes on the paper and suggests corrections. Instructors also provide indications of inappropriate word choice or usage. The instructor evaluates the organization of the writing, from the scale of the sentence to the whole paper. Students are expected to follow the proper formats for specific aspects of technical writing in our discipline (e.g. figures, tables, bibliography). Students' writing is evaluated for clarity and conciseness. In research papers, students are expected to demonstrate critical thinking appropriate to their knowledge of the discipline. Students are required to draw conclusions that are supported by the data presented and/or basic geologic principles, and these conclusions must be stated clearly and succinctly.

The grading rubric for writing assignments includes assessment of all of these aspects of the student's writing. Written work is returned to students with ample time for discussion of how the papers could be improved. In some courses, students may be allowed to resubmit a paper after making corrections.

The Geology Writing Plan

Courses that fulfill the Geology Writing Plan are listed below along with the writing assignments required in each course. All of the courses indicated here are currently offered in the geology program. Aside from the basic composition course, students can complete the WAC requirements by enrolling in courses in our department.

Students completing any major in geology (including environmental geology) must take ENG 102 (or its equivalent) and five additional courses to meet WAC requirements. Two of the WAC requirements will be met through courses required for all geology majors: * *Historical Geology* (and GEO 200L, the course lab) and *Structural Geology*. In *Historical Geology* and its laboratory, students complete a formal term paper. Tests include essay questions. Students also produce short narrative laboratory reports, and an extensive written narrative focused on the geological history of a region. They complete collaborative reports describing group projects that center on an environmental issue. Students in *Structural Geology* complete term papers.

We propose that students complete three additional courses from the list below. The list includes courses required for geology majors and courses acceptable as electives to any geology program:

GEO 300 ¹	<i>Environmental Geology</i>	requires a 10-page term paper, short (< 1 page) in-class writing assignments associated with problem sets, and short (< 3 page) narratives, including personal and group opinion papers, and letters to congress(wo)men. The essay format is used on all tests.
GEO 301 ^{2,3}	<i>Environmental Geology for Majors</i>	in addition to requirements as for GEO 300, students in 301 complete a 10-page term paper, a 5-10 page group writing project, and 1-5 page written narratives of laboratory projects. The essay format is used on all tests. In oral presentations, students will describe the results of the two lengthy writing assignments.
GEO 330	<i>Structural Geology</i>	requires a 10-page term paper, with an oral presentation
GEO 335 ³	<i>Surface Water Hydrology</i>	requires a research proposal, progress report, and research paper
GEO 390 ¹	<i>Geowriting</i>	requires students to complete 5 writing assignments as described above
GEO 399 ¹	<i>Independent Study</i>	summary paper
GEO 416 ⁴	<i>Petrology</i>	requires term project with written report and oral presentation
GEO 417 ^{1,2}	<i>Sedimentary Petrology</i>	requires a 10-page term paper and 1-5 page written narratives of laboratory projects. The essay format is used on all tests.
GEO 420 ⁵	<i>Stratigraphy & Sedimentology</i>	requires a term paper and lab reports. Students give oral presentations describing their term papers.
GEO 430 ³	<i>Hydrogeology</i>	requires formal 1 page write-ups for 8-10 problem sets and at least 10% of the course grade is based on oral discourse

GEO 440 ⁵	<i>Paleontology</i>	requires one formal term paper, and at least 4 essays on examinations during the course
GEO 475 ³ GEO 475L ³	<i>Geochemistry and Lab</i>	requires a 10-page term paper and 3-10 page written narratives of some laboratory projects; short (< 1 page) in-class writing assignments be completed in the context of problem sets. The essay format is used on all tests. Students make several oral presentations during the course.
GEO 499 ¹	<i>Independent Study</i>	summary paper
OCE 300 ¹	<i>Coastal Environments</i>	requires a 10-page term paper, short (< 1 page) in-class writing assignments associated with problem sets, and short (< 3 page) narratives, including personal and group opinion papers, and letters to congress(wo)men. The essay format is used on all tests. Students make oral presentations.
OCE 375 ^{1,2}	<i>Chemical Oceanography</i>	requires term project with written report incorporated in poster session (with oral presentations of same); students provide 1-3 page written evaluations of select papers read for class discussion. The essay format is used on all tests.
OCE 400 ¹	<i>Geological Oceanography</i>	requires a 10-page term paper and that students provide 1-3 page written evaluations of select papers read for class discussion. The essay format is used on all tests. Students make oral presentations.

1 An elective acceptable for any geology major

2 The course proposal has been submitted to APC but is not yet approved

3 Required for the B.S. environmental geology and an acceptable elective for other geology majors (when GEO 300 has APC approval, it will be required here)

4 Required for the B.A. or B.S. geology programs and an acceptable elective for the environmental geology major

5 Required for any major in geology

Special Circumstances

Because there are five writing courses that are core requirements for the geology degree, all of our majors, including transfers from outside institutions and transfers from other majors within the institution, will be able to complete this requirement.

Reference

Brown, L. M., Carson, C., Pingatore, D. R., and Rexroad, C. B., 1993. A comprehensive model for teaching writing and oral skills in the geology curriculum. *Journal of Geological Education*, v. 41, pp. 151-154.