

**Writing Across the Curriculum**  
**Biology Bibliography**  
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The sciences and mathematics have a large and growing body of both anecdotal and empirical research into the effects of introducing explicit writing instruction in the undergraduate curriculum. Additionally, there is a very large body of writing on the effects of writing instruction on science education in the elementary and secondary grades.

Journals devoted to teaching, such as *Journal of College Science Teaching*, and *American Biology Teacher*, regularly publish articles on teaching methods that depart from traditional lecture or rote-based laboratory teaching; those articles generally explore the uses of writing as a means of teaching and learning the content of science courses (in addition to learning the disciplinary conventions of science writing). In the last ten years, these articles and reports from the field have been increasingly written by practicing science educators in addition to specialists in writing instruction.

What follows here is a very selective annotation of fairly recent works and a list of additional resources. It is by no means comprehensive. It is also generally descriptive rather than evaluative; I leave such judgments to those better qualified than I.

Annotations marked with a double asterisk are copied from subject bibliographies made available by the Georgia State University WAC program at: <http://WWW.GSU.EDU/~wwwwac/>.

### **Book**

Connolly, P., & Vilaridi, T. (1989). *Writing to learn mathematics and science*. New York: Teachers College Press.

A collection of 23 essays by mathematicians, scientists, and compositionists. The essays are in the main practically oriented, offering concrete teaching strategies. But it does not reduce itself to practical concerns only, “[r]ather, it represents the necessary use of ordinary language to teach science and mathematics in all their subtlety, complexity, and richness” (xvi). The volume is particularly rich in specific classroom strategies used by practicing mathematicians and scientists. See especially, Martin, K. H. “Writing ‘Microthemes’ to Learn Human Biology” (pp. 112-31).

### **Articles**

Ambros, J. (1987). Writing to improve learning in biology. *Journal of College Science Teaching*, 263-266.

Argues that using writing assignments, particularly journal writing and microthemes, helps

students personalize and understand knowledge of biology, as well as improves their ability to write about science.

Brillhart, L.L., and M.B. Debs. (1981). Teaching writing--a scientist's responsibility. *Journal of College Science Teaching*, 303- 304.

Describes techniques faculty can use to teach writing in science courses, using lab reports. Discusses steps in writing a lab report, how much information should be given by teacher, and how to simplify grading.\*\*

Flynn, E., McCulley, G., and Gratz, R. Effects of peer critiquing and model analysis on the quality of biology student laboratory reports. ERIC ED 234 403.

Describes research on the effects of peer review, model analysis, or traditional teaching on the quality of written lab reports in a freshman biology class. (Model analysis is a critique of a published article.) Results: both peer review and model analysis improved the quality of lab reports, and model analysis was more effective than peer review.\*\*

—.(1986). Writing in biology: Effects of peer critiquing and analysis of models on the quality of biology laboratory reports. In Art Young and Toby Fulwiler (Ed.), *Writing Across the Disciplines: Research Into Practice* (pp. 160-175). Upper Montclair, NJ: Boynton/Cook.

Reports the same research as the ERIC article, above.

House, K. (1983). Improving student writing in biology. *American Biology Teacher* 45(5), 267-270.

Describes efforts to improve student writing in high school; claims significant improvement across the board was likely caused by integration of writing in several classes; suggests possible correlation between improved performance in biology class and integration of writing assignments in the class.

Moll, M., and Allen, R. (1982). Developing critical thinking skills in biology. *Journal of College Science Teaching*, 95-98.

Describes efforts of biology faculty at West Virginia University to teaching critical thinking skills to introductory biology students. Uses video and discussion during class to enable students to apply concepts as they learn them; derive concepts from observations and data; and practice scientific processes. Presents assessment of the program, including data on improvement in students' critical thinking skills pretest/posttest.\*\*

Rymer, J. (1988). Scientific composing processes: how eminent scientists write journal articles. In David A. Jolliffe (Ed.), *Writing in Academic Disciplines*. Vol. 2 of *Advances in Writing Research*. (Pp. 211-50).

Rymer interviewed nine scientists and conducted one formal case study of the writing of a journal article, to compare conventional assumptions about writing processes in scientific writing; she concludes that actual practice is much more recursive and more like the full range of strategies employed in other forms of professional, academic writing than the conventional, linear representation suggests. Rymer suggests that her research may indicate the need to expose students to a variety of formal and informal writing tasks in their science classes to better teach effective scientific writing as part of the whole range of scientific activity.

Spanier, B. (1992). Encountering the biological sciences: Ideology, language, and learning. In Anne Herrington and Charles Moran (Ed.), *Writing, Teaching, and Learning in the Disciplines* (pp. 193-212).

Argues for the transformative effects of writing instruction in biology classes, particularly in the raising of student awareness of the social contexts of scientific work.

Trombulak, S., & Sheldon, S. (1989). The real value of writing to learn in biology. *Journal of College Science Teaching* 18(6), 384-386.

Describes efforts to empirically verify anecdotal claims of student improvement through WAC; reports mixed results in biology courses using only journal-writing assignments in the study; attributes some change in performance to differences in students; reports a two-third increase in letter grades in one class, and suggests that improvement seems tied to the writing instruction; calls for more research.

Wilkinson, A.M. (1985). A freshman writing course in parallel with a science course. *College Composition and Communication* 36 (2), 160- 165.

Describes a writing course linked to a biology course. Writing assignments in the 2 courses coordinated; writing for the biology course was discussed in the writing course. Authors note disadvantages (lack of biology background of faculty; difficulty in constructing a syllabus for the writing course, given that it was dependent on the biology course syllabus) and advantages (students wrote more, and in more different forms; easy for students to move from consideration of published papers to their own papers).\*\*

### **Additional Resources**

Ambros, J. (1988). Clustering: An interactive technique to enhance learning in biology. *Journal of*

*College Science Teaching* 18, 122-127, 144.

Cannon, R. E. (1990). Experiments with writing to teach microbiology. *American Biology Teacher* 52(3), 156-158.

Dale, A. R., & Hanson, S. L. (1993). Conversations with a petri dish (Creative writing for biology lab reports). *American Biology Teacher* 55, 84.

Pechenik, J. A. (1993). *A short guide to writing about biology*. New York: Harper Collins College Publishers.

Rosenbaum, N. (1981). Writing in the biology classroom. (ERIC Document Reproduction Service No. ED 244 275)

TePaske, E. R. (February, 1982). Writing in biology: One way to improve analytical thinking. *American Biology Teacher* 44, 98-99.

Totten, S., & Tinnin, C. (1988). Incorporating writing into the science curriculum. *Science Activities* 25 (4), 25-29.