Chemistry is taught at Rhode Island College in two majors, (BA and BS) with three tracks in the BS (Professional Chemistry, Biological Chemistry, and Environmental Chemistry.) While writing is taught throughout the curriculum, our writing in the discipline objectives are specifically addressed in chemistry courses that are common to all the programs.

While writing in chemistry takes several forms, its common objective is to communicate information about experiments, calculations, and conclusions to audiences ranging from fellow chemists to the general public. From introductory to advanced courses in the major, chemistry students are given opportunities to learn how to keep a lab notebook to record laboratory procedures, data, and conclusions and to write reports that summarize the scientific literature and/or describe and explain experimental results.

Good scientific writing is clear, concise, unambiguous, and occasionally poetic. The rules of grammar that students have already mastered form a foundation. For chemistry, most writing is storytelling, but with precise stylistic rules. Such writing does not come naturally to undergraduate students. In the chemistry program, scientific writing, beyond answers to exam questions, is taught first in General chemistry (CHEM 103-104). Students write laboratory reports that include abstracts of their laboratory work in which they distill the objective of the work, methods, results, and conclusions into a concise narrative. Each of these abstracts is returned with comments and suggestions, so over the course of two semesters, students’ writing markedly improves. This work in the first-year sequence serves as an introduction to writing in chemistry.

The specific courses in which chemistry students learn to write in the discipline are Organic Chemistry (CHEM 205-206), usually taken in the sophomore year, Analytical or Environmental Analytical Chemistry (CHEM 404 or 416), typically taken in the junior year, and Physical Chemistry I Laboratory (CHEM 407), taken in the junior or senior year. Learning to write as a chemist is progressive, and students gain broader and deeper experiences and refine their writing skills as they advance through their program.

An essential writing skill for chemists is learning to keep a good laboratory notebook. The lab notebook is the permanent record of all experimental work. In research labs, it is the notebook record that provides data for publication or a patent claim. Future workers need to be able to repeat an experiment from the notebook record. Recording procedures, data, and observations neatly and legibly as one carries out an experiment is not easy, and it takes practice for students to be successful at this task. In the chemistry program, students learn to keep laboratory notebooks in Organic Chemistry (CHEM 205-206). The notebook is used to record procedures, observations, data, and conclusions. The notebook is reviewed by the instructor, graded, and returned so students can improve their notebook-writing skills for future experiments. Students apply these skills in upper level lab courses and in undergraduate research.

In chemistry, one’s work is communicated to others by means of reports and journal articles to be read by supervisors, coworkers, fellow scientists, and sometimes the general public. Such re-
ports generally include an introduction summarizing the chemical literature related to the work with appropriate citations. They also include a detailed experimental or materials and methods section that reports the experimental procedures in sufficient detail that they could be replicated. The most important parts of any paper or report are the results and conclusions. These sections often include data tables, graphs, and figures. Distinct styles and conventions are observed by chemists in the different branches of chemistry, which are reflected in the chemical literature of each field. Students learn to appreciate such variation as they encounter different expectations in the details of laboratory reports in Organic, Analytical, and Physical Chemistry.

In addition to the lab notebook, Organic Chemistry students are required to write one or more laboratory reports on their work using the style of a journal article in organic chemistry. In the process of writing these reports, students are introduced to the stylistic conventions of organic chemistry. Peer review is used for some assignments, some instructors review and comment on (but do not grade) a draft of the paper; or, after the reports are evaluated and returned with comments, students are required to take them to the Writing Center for help before resubmission.

Students build on this writing experience in Analytical or Environmental Analytical Chemistry (CHEM 404/416. Here they deal with very different sorts of data and results and must conform to the standards of the sub-discipline. In Analytical they also learn many skills that will be of use to them in any future writing in chemistry, such as formatting data and results in tables, designing and displaying graphs, charts, and figures, and writing and inserting clear, accurate, informative, and succinct captions.

In Physical Chemistry Lab I (CHEM 407), students write more comprehensive formal laboratory reports that include all the elements of a journal article or research report in a variety of formats. In writing these reports students employ the skills they have learned in their earlier courses to write detailed reports that include background information, objectives, procedures, results, and a discussion. The specific format varies from assignment to assignment, much as the guidelines for journal articles and professional reports vary with the intended audience.

In each of these experiences students learn to acquire and cite literature data and discussions appropriate to the assignments. Chemists are expected to cite accurately everything that comes from the chemical literature. In these courses we teach the citation formats according to the ACS Style Guide. By the time these foundational courses are completed, students have a solid basis for scientific writing. As their programs diverge, and they select different advanced courses, writing skills are reinforced with content-specific assignments, and for many chemistry majors they culminate in the production of a comprehensive paper on their undergraduate research.

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1 Coghill, Anne M.; Garson, Eds. The ACS Style Guide; American Chemical Society: Washington, DC, 2006