

# **Adopting Writing Intensive Strategies to Teach Biology in Laboratory Environments**

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## **Abstract**

Instructors are often averse to employing writing for learning and assessment due to the time it takes to create and grade effective writing assignments. Writing Intensive Program (WIP) guidelines aim to improve 1) students' abilities to write, evaluate peers' writing, and think critically about content; 2) instructors' abilities to grade and give feedback; and 3) instructors' own writing. This workshop consisted of: a presentation of WIP guidelines; opportunities for participants to practice using WIP responding strategies; a discussion of the importance of training TAs to communicate the writing process to students; and a discussion of the effectiveness of WIP in introductory biology laboratories.

## Introduction

This major workshop was an extension of a mini-workshop given at ABLE 2008: “Strategies for Responding to Student Laboratory Writing Assignments.” Extensive research indicates that engaging students in the process of writing enables them to demonstrate greater understanding of content and concepts while also advancing metacognitive learning strategies. However, course instructors are often averse to employing writing as a means of learning and assessment due to the anticipated time it takes to create effective writing assignments and then grade them. This mentality only reinforces the lack of writing practiced inside and outside the classroom. In fact, an instructor can assign a variety of writing assignments that assess different levels of learning and that do not require extensive time to grade. Biology laboratories are no exception to this notion; writing is an excellent component of active learning laboratory exercises. This includes not only learning to write (i.e. in the discipline of biology) but also writing to learn (i.e. to express how to do and think about biology). The Biology Division at the University of Georgia currently employs the guidelines of the Writing Intensive Program (WIP) in two introductory biology laboratory courses (one non-majors course and one majors course). Created by the Franklin College of Arts and Sciences (UGA), WIP guidelines are designed to be adopted by any discipline and aim to help improve 1) students’ abilities to compose text, evaluate peers’ writing, and think critically about writing content; 2) instructors’ abilities to grade and give feedback to student writing; and 3) instructors’ own writing.

Our goals for this workshop were to give ABLE participants strategies to approach grading and responding to student writing with less dread and in an efficient, yet more substantial way. By learning and practicing WIP responding strategies, we expect that lab instructors can incorporate improved and/or additional writing opportunities into their biology lab classes. Our workshop was comprised of the following activities: 1) a 20-minute presentation and discussion of the theoretical underpinnings of WIP guidelines; 2) a 60-minute period with opportunities for participants to practice using WIP responding strategies as they apply to different stages of student writing and to compare and discuss their current responding strategies as well as those from teaching assistants (TAs) who have and have not experienced WIP training; 4) a 20-minute discussion of the importance of training teaching assistants (TA) to communicate the writing process as it relates to science; and 5) a 20-minute discussion of the “effectiveness” of employing WIP principles in introductory biology laboratories as self-described by both the undergraduates enrolled in these labs and the TAs teaching them and of TAs’ self-reported perceived benefits of receiving WIP training.

During the first part of the presentation, we explained the WIP principles. We described how instructors can respond to a continuum of types writing assignments and emphasized the importance of utilizing specific responding strategies depending upon the particular type of writing assignment assigned. For instance, “low stakes” (or “writing-to-learn”) assignments, which tend to be informal assignments worth few or no points, can be used by instructors as quick checks for student comprehension (i.e. formative assessment). Responding to these assignments can be as simple as a check/check +/check – system, or one written comment. “High stakes” (or “learning-to-write”) assignments, such as lab papers or research proposals, emphasize writing as a process to convey students’ understanding of a lab activity and its outcome (i.e. summative assessment). These assignments tend to have multiple drafts, and depending on the draft stage, require certain types of feedback. Comments on early drafts focus on approximately three global issues related to the student work, such as presence/absence of a thesis statement or logical order to sections, while later drafts necessitate comments that are more finely focused, such as editing or sentence-level issues.

In our 60-minute working session, we described and provided examples of rubrics which can be used to provide feedback that is appropriate to these two dramatically different levels of writing. We also discussed how changing the ways in which we provide comments to student writing can result in more focused and useful feedback for students. Further, by utilizing these strategies, lab instructors can respond to student work in a time-efficient manner. Participants were given student work to read (high stakes assignment, second draft) with TA comments on them in order to compare how well the TAs were implementing WIP responding strategies. Participants also had opportunities to compare responses from TAs who have been trained in WIP principles with responses from TAs who have not been trained. We discussed and critiqued the TAs' comments. Then, participants were able to engage in practicing responding to another example of student work.

The remainder of the workshop was devoted to two discussion topics. First, we discussed the importance of TAs being able to communicate the writing process as it relates to science and to effectively employ WIP guidelines. During the second discussion, data was shared that included: 1) self-reported perceived benefits of employing WIP principles in the introductory biology laboratories as described by both the undergraduate students enrolled in these labs and the TAs teaching them and 2) TAs' self-reported perceived benefits of receiving WIP training.

Since this major workshop did not expound on a particular laboratory exercise, we provided a packet of documents that included the following: 1) copies of the PowerPoint presentation about WIP principles; 2) sample assignments and grading rubrics; 3) sample student work; 4) sample TA feedback to these assignments; 5) sample student work for participants to practice responding methods; and 6) data describing the effectiveness of WIP in introductory biology laboratories.

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### **About the Author(s)**

Kristen Miller currently serves as the Laboratory Manager for introductory biology teaching laboratories at the University of Georgia (UGA). She is also a doctoral candidate in the Department of Science Education at the University of Georgia. Within these capacities, Kristen is actively engaged in laboratory curriculum development using pedagogy of teaching science as inquiry, research in and implementation of writing in the science laboratory environment, and graduate student teacher development. Her dissertation focuses on the effects of an inquiry science teaching preparation program on graduate student instructors and undergraduate students taking introductory biology labs with inquiry-focused activities. Kristen received an M.S. in Conservation Ecology and Sustainable Development and an M.S. in Biopsychology, both from UGA, and a B.A. in Animal Behavior from Bucknell University.

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### **Appendices**

Supplementary information provided as pdfs linked to this document.