

PREFACE

The goal of this handbook is to provide students with a practical, readable resource for communicating their scientific knowledge according to the conventions in biology. Chapter 1 introduces the scientific method and experimental design. Because the scientific method relies heavily on the work of other scientists, students must learn how to locate primary references efficiently, quite often using article databases and scholarly search engines (Chapter 2). Once a suitable journal article has been found, the next challenge is to read and understand the content. Chapter 3 describes scientific paper tone and format, provides strategies for reading technical material, emphasizes the importance of paraphrasing when taking notes, and gives examples of how to present and cite information to avoid plagiarism. Using the standards of journal publication as a model, students are then given specific instructions for writing their own laboratory reports with accepted format and content, self-evaluating drafts, and using peer and instructor feedback to refine their writing (Chapters 4 and 5). Besides writing about it, scientists communicate scientific knowledge through posters and oral presentations. How these presentation forms differ from papers in terms of purpose, content, and delivery is the subject of Chapters 7 and 8.

Scientific communication requires more than excellent writing skills—it requires technical competence on the computer. Most first-year students have had little experience producing Greek letters and mathematical symbols, sub- and superscripted characters, graphs, tables, drawings, and equations. Yet these are characteristics of scientific papers that require a familiarity with the computer beyond basic keyboarding skills. For exactly this reason, almost half of the book is devoted to Microsoft Word, Excel, and PowerPoint features that enable scientists to produce professional quality papers, graphs, posters, and oral presentations effectively and efficiently.

In the Third Edition, the appendices have been updated for Microsoft Office 2007. To enable users of Office 2003 to make a quick transition to Office 2007, each appendix has a table that summarizes frequently used commands and where they are located in the new programs. The Excel appen-

dix has been expanded to include sections on formulas and instructions for making bar graphs and pie charts and adding error bars about the means. Chapter 8 contains instructions for making posters in PowerPoint 2007.

Technology has also driven other changes in the Third Edition. The focus of Chapter 2 has been shifted from finding primary references to developing a literature search strategy: criteria for choosing a database or search engine to find scholarly information; strategies for defining effective keywords; ways to expand or limit a search; tips on evaluating hits and finding related articles; options for retrieving full-text articles; and an introduction to RefWorks as an example of reference management software that reduces the tediousness of formatting citations and end references in scientific papers. The section on plagiarism in Chapter 3 has been expanded to help students recognize what kinds of information must be acknowledged and how to do so appropriately. Because so much of the primary literature is now available in electronic format, the Documenting Sources section of Chapter 4 has been expanded to cover in-text citation and end-reference format for electronic journal articles, databases, and websites. To illustrate principles of designing effective posters, sample posters can be found on the Sinauer Associates website (<http://www.sinauer.com/kniseley/>), each accompanied by a short evaluation of the layout and content.

While some users of this book may enjoy reading it cover-to-cover, the majority will use it primarily as a look-up reference. Most of the sections are designed to stand alone so that readers can look up a topic in the index and find the answer to their question. Those who want to learn more about the topic have the option of reading related sections or entire chapters.

The book is augmented by ancillary materials available on the Sinauer Associates website. A biology lab report template in Microsoft Word provides prompts that help students get used to scientific paper format and content. The Biology Lab Report Checklist can be printed out to help students self-evaluate or peer review lab reports. Both instructors and students may find the Laboratory Report Mistakes table handy for use in both the revision and feedback stages. The Evaluation Form for Oral Presentations enables listeners to provide feedback to the speaker on things that he/she is doing well as well as areas that need improvement. Similarly, the Evaluation Form for Poster Presentations can be used as a checklist for the presenter and an evaluation tool for participants during the actual poster session.

Acknowledgments

Feedback from users of the Second Edition guided changes made in the Third Edition. In particular, I would like to thank my students in Introduction to Molecules and Cells (BIOL205) and Organismal Biology (BIOL206)

laboratories for giving me suggestions on how to improve this book. The following comment exemplifies the attitude of many first- and second-year biology students toward writing, and makes me smile: "I don't enjoy writing lab reports, but your book was extremely helpful in doing so." My colleagues in the Biology Department at Bucknell University continually provide me with fresh and refreshing ideas on teaching and I am proud to be part of such a collegial group. I am indebted to the helpful professionals in Library and Information Technology at Bucknell for answering my research and computer-related questions, especially Kathleen McQuiston (article databases and scholarly search engines), Dave Kline and Melissa Rycroft (locating the PatternUI add-in and explaining how to install it), Jim van Fleet (RefWorks), and Debra Balducci (photographing and editing posters). Special thanks go to Carmen Acuna (Bucknell University) for all the good things I learned in her statistics class, to Marvin H. O'Neal III (Stony Brook University) for his suggestion to add a section on formulas and for making me aware of Microsoft's online interactive guide, and to Teresa Bell, a SkillPath Seminars presenter, for her many practical suggestions on "How to Build Powerful PowerPoint Presentations." I would also like to thank Sandy Field and Kathy Shellenberger for providing feedback on Chapter 2 and for many enjoyable conversations.

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I am grateful to all the professionals at Sinauer Associates who helped with the production of this book, especially Andy Sinauer, who provided encouragement, feedback, and organizational input on all three editions. Sydney Carroll, Christopher Small, Joan Gemme, Joanne Delphia, and Janice Holabird guided the Third Edition through the editorial and production processes. Jefferson Johnson deserves the credit for the cool cover and Jason Dirks and Nate Nolet set up the website for the ancillary materials.

My passions outside of teaching biology helped shape the style and content of this book. I have always loved sports and, for the past 10 years, have helped coach girls' lacrosse teams in the Central Susquehanna Valley. Just as coaching and teaching go hand in hand, excelling on the playing field

and in the classroom both require preparation, discipline, teamwork, and a willingness to do one's best. Through lacrosse, I have had the privilege of meeting players, parents, coaches, and umpires who have helped me become a better teacher and coach.

As a freelance German to English technical translator, I appreciate the challenge of choosing just the right words to communicate information faithfully, in a clear and concise manner, and according to conventions familiar to the reader. I am indebted to the translation profession for setting high standards of quality. While the process of writing in a particular genre is challenging, it is also immensely satisfying: We experience the joy of learning, the pleasure of sharing our knowledge with others, and the creativity involved in putting thoughts into words. Especially rewarding is the enthusiasm we generate when we communicate our knowledge well.

Lastly, I would like to thank my family and friends for their unwavering encouragement and love. My late father, Adolph Wegener, instilled in me a love of learning and supported me in all of my endeavors; I will miss him. My mother, Elfriede, has been a role model and inspiration for me throughout my life. My children, Katrina, Carleton, and Brian, continue to be my pride and joy. I would not be able to pursue all of my passions without the support of my husband, Chuck, whose love and sense of humor sustain me.

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