Preface

Biology—like no other discipline—uses concepts as a way to understand ourselves and the world we live in. An understanding of biological principles should be within the grasp of all those who decide to study biology. As a biology instructor, I am first and foremost motivated by the desire to help science-shy students gain a conceptual understanding of biology. This determination has inspired me through many years of authoring textbooks. In both my teaching and my writing, the non-major student has always been my primary focus.

Today we have many ways to reach out to students and increase their motivation so that they will understand the concepts of biology. I have watched the evolution of introductory biology textbooks as they moved from utilization of only a "second color" to beautifully illustrated figures in full color. This text uses the latest techniques to captivate students, enabling them to tap into their own resources and appreciate the world around them.

Concepts of Biology was written not only to present the major concepts of biology clearly and concisely but also to show the relationships between the concepts at various levels of complexity. Students also need to see how biological concepts pertain to their own lives in a meaningful way. This text fulfills these goals.

What Sets This Book Apart

Focus on Concepts

Concepts of Biology is organized around five major concepts of biology—all organisms are composed of cells, contain genes, evolve, are homeostatic, and live in ecosystems—and this organization facilitates the use of relationships to create a cohesive whole. Using the levels of biological organization as a model, this text begins with the cell and ends with ecosystems. Just as the levels of biological organization flow from one level to the next, relationships between biological themes and topics are emphasized throughout the book.

"The organization of the text around the major theories of Biology is a wise path to follow; it integrates the chapters into themes and points out the development of a theory.... If these chapters are representative of the text, you have a real winner on your hands in a very competitive marketplace." —Paul E. Wanda, Southern Illinois University, Edwardsville

Emphasis on the concepts of biology begins with the part titles that are patterned after the major concepts of biology.

Part I: Organisms Are Composed of Cells
Part II: Genes Control the Traits of Organisms
Part III: Organisms Are Related and Adapted to Their Environment
Part IV: Plants are Homeostatic
Part V: Animals are Homeostatic
Part VI: Organisms Live in Ecosystems

Learning through Relevancy

Showing how concepts relate to each other and to student experiences are hallmarks of this text. An inviting and visually appealing story generates a desire to proceed with the chapter. These stories demonstrate that organisms and biological phenomena are of extreme interest in their own right. Each story ends with a lead into the rest of the chapter.

Each chapter is organized around concepts, and each concept is broken down into manageable topical sections. A brief introduction acclimates students to the concept, and the topical sections that follow provide evidence and lend support to the concept. This careful progression through the content, combined with transitions between topics, emphasizes how concepts are related and enables students to understand biology as more than isolated facts.

"The author has done an outstanding job of developing concepts in a logical, interesting, and student-friendly manner." —Pamela L. Hanratty, Indiana University

The use of analogies helps students relate to and follow the discussion and, in like manner, numbers that refer to the correct part of an illustration promote the learning process. Each section concludes with a question (answered in Appendix A) that encourages students to apply what they have learned. When appropriate, the questions refer back to the opening story to actively engage students.

Applications are used throughout each chapter to show how biological concepts relate to students' lives, but the emphasis on applications is especially evident within the sections entitled, "How Biology Impacts Our Lives" and "How Science Progresses."

Each chapter ends with a "Connecting the Concepts" box that reviews the concepts of the chapter and tells how they relate to other concepts throughout the book. Each part ends with a "Biological Viewpoints" reading that provides students with take-home messages about the major concept emphasized in that part of the text.

Concise Writing, Instructional Art, and a Proven Pedagogical System

Writing Style

Concepts of Biology went through several stages of revision, but I maintained my clear and concise presentation of the major

concepts as I worked to include as many relationships and applications as possible. Students will find the book easy to read and understand.

"This book uses everyday language to immerse the student into the world of science."
—Michael P. Mahan, Armstrong Atlantic State University

Instructional Art

Outstanding photographs and dimensional illustrations, vibrantly colored, are featured throughout *Concepts of Biology*. Accuracy and instructional value were primary considerations in the development of each figure. Students will learn from a variety of figure types, including process figures with numbered steps that relate to the text discussion, micro to macro representations, and the combination of photos and art.

Pedagogical System

Each chapter features numerous learning aids that were carefully developed to help students grasp challenging concepts. Examples include:

- **Learning Outcomes,** listed according to the chapter concepts, provide students with an overview of what they are to know.
- **Check Your Progress** questions at the end of each section help students assess and/or apply their understanding of a concept.
- A bulleted and illustrated **Summary** is organized according to the chapter concepts and helps students review the chapter.
- **Testing Yourself** offers another way to review the chapter concepts. Included are objective multiple-choice questions and Thinking Conceptually questions that ask students to apply their understanding of a concept.
- **Understanding the Terms** is a page-reference list of the boldface terms in the chapter. A matching exercise allows students to test their knowledge of the terms.
- **Thinking Scientifically** questions end the chapter. These questions apply directly to the chapter and ask students to design an experiment or explain some part of a hypothetical experiment.
- All questions are answered in Appendix A.

For a visual presentation of the key features of *Concepts of Biology*, see the Guided Tour on pages vi–xii.

I hope students will be motivated to develop a solid understanding of the biological concepts presented in *Concepts of Biology*, as well as an understanding of the relationships between the concepts. With this understanding of biology, students will continue to appreciate how biological concepts pertain to their decisions and actions long after they have completed their introductory biology course.

"It would be fun to teach and learn using this book."
—Brian W. Schwartz, Columbus State University

About the Author

Dr. Sylvia S. Mader has authored several nationally recognized biology texts published by McGraw-Hill. Educated at Bryn Mawr College, Harvard University, Tufts University, and Nova Southeastern University, she holds degrees in both Biology and Education. Over the years she has taught at University of Massachusetts, Lowell, Massachusetts Bay Community College, Suffolk University, and Nathan Mathew Seminars. Her ability to reach out to science-shy students led to the writing of her first text, *Inquiry into Life*, that is now in its twelfth edition. Highly acclaimed for her crisp and entertaining writing style, her books have become models for others who write in the field of biology.

Although her writing schedule is always quite demanding, Dr. Mader enjoys taking time to visit and explore the various ecosystems of the biosphere. Her several trips to the Florida Everglades and Caribbean coral reefs resulted in talks she has given to various groups around the country. She has visited the tundra in Alaska, the taiga in the Canadian Rockies, the Sonoran Desert in Arizona, and tropical rain forests in South America and Australia. A photo safari to the Serengeti in Kenya resulted in a number of photographs for her texts. She was thrilled to think of walking in Darwin's steps when she journeyed to the Galápagos Islands with a group of biology educators. Dr. Mader was also a member of a group of biology educators who traveled to China to meet with their Chinese counterparts and exchange ideas about the teaching of modern-day biology.

For My Children

—Sylvia Mader