

Preface

No one who teaches biology today can fail to appreciate how important a subject it has become for our modern world. As a teacher, I have stood in front of classrooms for over 25 years and attempted to explain biology to puzzled and sometimes uninterested students, an experience that has been both fun and frustrating: fun because biology is a joy to teach, rich in ideas and interesting concepts, and increasingly key to many important public issues; frustrating because in every biology class there are always some students who will not pay attention, who not only miss out on the fun but also fail to acquire a tool that will be essential to their futures.

This book, *The Living World*, is my attempt to address that problem. It is short enough to use in one semester, without a lot of added material to intimidate wary students. I have tried to write it in an informal, friendly way, to engage as well as to teach. The focus of the book is on the biology each student ought to know to live as an informed citizen in the twenty-first century. I have at every stage addressed ideas and concepts, rather than detailed information, trying to teach *how* things work and *why* things happen the way they do rather than merely naming parts or giving definitions.

My first step in creating this text was to attack the traditional table of contents (usually a formidable list of chapters covering every subject imaginable). The number of chapters in biology textbooks has grown over the years, until today the most widely used short texts have as many as 38 chapters. I have cut back ruthlessly on this overwhelming amount of information, reducing the number of chapters in *The Living World* to 28. I think it matches closely what is actually being taught in classrooms and, as you will see, all that is really important is preserved.

I have deliberately combined photosynthesis and cellular respiration into a single general chapter in *The Living World*, not because metabolism is unimportant but because the basic principles a student needs to understand are simple and easy to explain, while the details of chemical reactions only get in the way of many students' ability to see concepts. Details are sacrificed, but the basic concepts are presented clearly enough for nonmajors students to grasp.

Another key step in designing *The Living World* was to combine the teaching of evolution and diversity into a single story line. Traditionally, students are exposed to weeks of evolution before tackling animal diversity, struggling past the Hardy-Weinberg equilibrium and population growth equations

(microevolution) and on through Darwin's discoveries (macroevolution). Then, when that is all done, they are dragged through a detailed tour of the phyla, followed by a long excursion into botany. In large measure, the three areas are presented as if unrelated to each other. In *The Living World* I have chosen instead to combine all three of these areas into one treatment, presenting biological diversity as an evolutionary journey. It is a lot more fun to teach this way, and I find that my students learn a great deal more, too.

I have also chosen to present ecology in a novel way. Rather than taking a levels-of-organization approach (that is, population ecology, community ecology, ecosystems, and biomes), I focus on the basic unit of ecology, the ecosystem—also the most relevant to the world's problems today. After describing what ecosystems are and how they function, I discuss how the architecture of ecosystems has been shaped by coevolution, how ecosystems respond to disruption, and what factors make some ecosystems more stable to disruption than others. Finally, I present a picture of the kinds of disruptions going on today. The approach throughout is positive and solution-oriented.

Forgive me if you find some favorite topic omitted or treated more lightly than you would wish—keeping this book brief and approachable has limited the amount of material that could be included. But I feel the benefit far outweighs the cost, for this is a book students can learn from.

As you page through the book, you will notice that major topics begin at the start of a page. This is no accident but rather the result of careful planning. Unlike most texts, the pages of *The Living World* were laid out by the author, so that I was able to create a very user-friendly organization of material.

In an effort to make the book more fun for students and at the same time increase its power as a learning tool, I have incorporated interactive CD-ROM *Explorations* into 16 of the chapters. The publisher has also opened a web site on the Internet for each chapter, which students can use to investigate further topics. Although students can use the text perfectly well without these new technological features, they add to the richness of the experience. I hope you will be tempted to try them with your class.

While it is not the first book I have written and probably will not be the last, *The Living World* has been one of the most challenging and rewarding. I hope that you like it—and that you find it an effective teaching tool.

Learning Aids

In the Text

Each chapter of *The Living World* provides the student with several features designed to facilitate study and learning.

Chapter Opener

A "Far Side" cartoon at the beginning of each chapter captures student interest and shows that science can be fun.

Chapter Outline

At the beginning of each chapter, an outline of the main chapter headings introduces the student to the topics about to be discussed.

End-of Chapter Highlights

This concise, visual summary highlights the main headings and key illustrations within the chapter. It recaps the concepts that relate to each main topic and links them to the most important key terms with page references.

Concept Review

Objective questions (multiple-choice and fill-in-the-blank) provide a built-in study guide, enabling students to quiz themselves on the material just read.

Challenge Yourself

Critical thinking questions challenge students to apply the concepts presented in the chapter.

For Further Reading

A list of sources points students and instructors toward additional related material and provides a brief overview of each book or article.

Technology Links

Icons indicate multimedia sources, including *The Living World's* own web site, where students can obtain supplementary material or practice applying the chapter concepts.

In addition, at the end of the book, students will find:

Appendix A: The Classification of Life

Illustrations and narrative explain the six-kingdom classification system used in *The Living World*.

Appendix B: Answers to Concept Reviews

Answers to the objective questions at the end of each chapter are provided so that students can get immediate reinforcement as they quiz themselves on the material.

Glossary of Key Terms and Concepts

This glossary contains definitions and derivations of the most important key terms used in biology and in *The Living World*.

Index

A comprehensive index is provided.

Ancillaries

Instructor's Manual/Test Item File

Prepared by Jennifer Carr Burtwistle of Northeast Community College, the *Instructor's Manual* provides the following instructor aids for each chapter of *The Living World*: chapter overview, learning objectives, student activities, discussion ideas, and a list of audiovisual materials. The test item file offers approximately 35 questions per chapter (multiple-choice, fill-in-the-blank, and essay) as well as answers for all.

Computerized Testing Software

The test item file is also available on disk with a test generator program in either Macintosh or Windows.

Transparencies

Two hundred full-color illustrations from the book are available as transparency acetates and provided free to adopters.

Student Study Guide

The *Student Study Guide*, by Lisa Shimeld of Crafton Hills College, contains chapter concepts, objective questions (multiple-choice, completion, and matching), drawings for students to label, key word searches, crossword puzzles, and a list of related web sites. An appendix provides the answers to all questions and activities.

How to Study Science

How to Study Science, second edition, by Fred Drewes of Suffolk County Community College, contains helpful tips and practical exercises to help students achieve success in biology and other science courses.

Basic Chemistry for Biology

Basic Chemistry for Biology, by Carolyn Chapman of Suffolk County Community College, is a self-paced book that leads students through basic concepts of inorganic chemistry.

How Scientists Think

How Scientists Think, by *The Living World* author George Johnson, is a paperbound text describing 21 experiments that have shaped our understanding of genetics and molecular biology. It fosters critical thinking and reinforces the scientific method.

Biology Study Cards

This boxed set of 300 two-sided study cards provides a quick yet thorough visual synopsis of all key biological terms and concepts in the general biology curriculum. Each card features a masterful illustration pronunciation guide, definition, and description in context.

The Internet Primer:

Getting Started on Internet

This primer, by Fritz J. Erickson and John A. Vonk, gives you just enough knowledge for getting started on the Internet, including the basics of how to access and use some of the Internet's most common features.