

Preface

The origin of this book remains deeply rooted in our concern for the education of college students in the field of biology. We believe that large, thick books intimidate introductory-level students who are already anxious about taking science courses. With each edition, we have worked hard to provide a book that is useful, interesting, and engaging to students while introducing them to the core concepts and current state of the science.

The Thirteenth Edition

There are several things about the thirteenth edition of *Concepts in Biology* that we find exciting. This revision, as with previous editions, is very much a collaborative effort. When we approach a revision, we carefully consider comments and criticisms of reviewers and discuss how to address their suggestions and concerns. As we proceed through the revision process, we solicit input from one another and we critique each other's work. This edition has several significant changes.

Opening Chapter Vignette

The opening page of each chapter now begins with a vignette that presents a situation or scenario that students are likely to encounter. The scenario is intended to draw the students into the chapter by showing how the material is relevant to their lives. At the end of the vignette, the student is asked to consider three questions. Two of the questions are factual. The student should be able to answer these after reading the chapter. The third question poses an ethical dilemma and is meant to challenge the student to think about the topic in broader philosophical terms.

Background Check Feature

Each chapter is written with the assumption that the reader has certain background information. A new feature—Background Check—explicitly states the key concepts the reader should already understand in order to get the most from the chapter. Students who lack this essential background information are referred to the chapter where the concepts are discussed.

Enhanced Visuals and Page Layout

The visual elements of a text are extremely important to the learning process. Over 130 figures are new or have been modified. The purpose of these changes is to more clearly illustrate a concept or show examples of material discussed in the text.

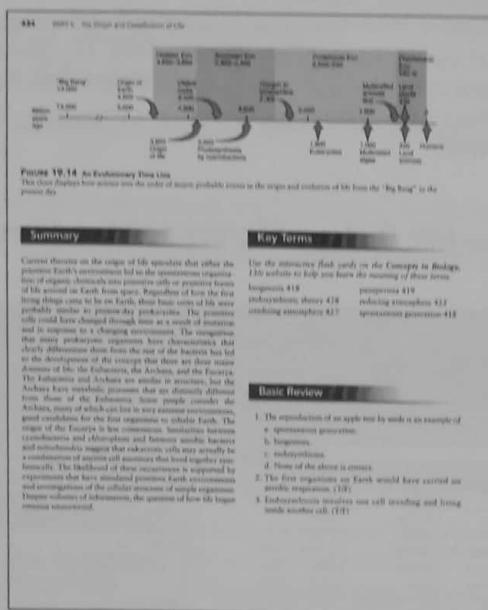
Major Content Changes

- The sections on the carbon and nitrogen cycles in chapter 15 have been completely rewritten to more clearly show the contributions of the various kinds of organisms involved in the cycles.
- A new section on aquatic ecosystems has been added to chapter 16.
- New sections on Mediterranean shrubland and tropical dry forest have been added to chapter 16.
- Several new boxed readings have been added:
 - HOW SCIENCE WORKS 2.2: The Scientific Method, Chemistry, and Disaster
 - OUTLOOKS 3.3: Fat-Like but Not True Fats—Waxes
 - OUTLOOKS 5.1: Passing Gas, Enzymes, and Biotechnology
 - OUTLOOKS 6.1: What Happens When You Drink Alcohol
 - OUTLOOKS 6.3: Body Odor and Bacterial Metabolism
 - OUTLOOKS 7.2: Even More Ways to Photosynthesize
 - HOW SCIENCE WORKS 20.1: How Scientific Names Are Chosen
 - HOW SCIENCE WORKS 21.2: Bioremediation
 - OUTLOOKS 25.1: Exercise: More than Just Maintaining Your Weight
 - OUTLOOKS 27.1: Cryptorchidism—Hidden Testes

Other Significant Changes

- In chapter 1, the How Science Works box on Edward Jenner and vaccination was updated with the most recent recommendations on vaccinations from the Centers for Disease Control and Prevention.
- The term *endomembrane system* is introduced in chapter 4.
- There is a new summary table of Photosynthesis in chapter 7.
- In chapter 9, each of the stages of mitosis and meiosis begins with a list of key points to help the reader sort out the essential changes that occur in each stage.
- The format for the solution of genetic problems has been modified to make it easier for the reader to follow the steps in chapter 10.
- New material on re-emerging infectious diseases has been added to chapter 13.
- New material on human evolution has been added to chapter 14.

Page-Referenced Key Terms A list of page-referenced key terms in each chapter helps students identify the vocabulary they need to understand the concepts and ideas presented in the chapter. Definitions are found in the glossary at the end of the text. Students can practice learning key terms with interactive flash cards on the Assessment Review Instruction System (ARIS) site.



Basic Review and Concept Review Questions

Students can assess their knowledge by answering the basic review questions. The answers to the basic review questions are given at the end of the question set, so students can get immediate feedback. The concept review questions are designed as a "writing-to-learn" experience. Students are asked to address the concept questions by writing a few sentences, making a list, or composing a paragraph. Concept review questions are answered on the student site of the Assessment Review Instruction System (ARIS).

Teaching Supplements for the Instructor

McGraw-Hill offers a variety of tools and technology products to support the thirteenth edition of *Concepts in Biology*.

McGraw-Hill's ARIS—Assessment, Review, and Instruction System

McGraw-Hill's ARIS is a complete, online electronic homework and course management system, designed for greater ease of use than any other system available. Created specifically

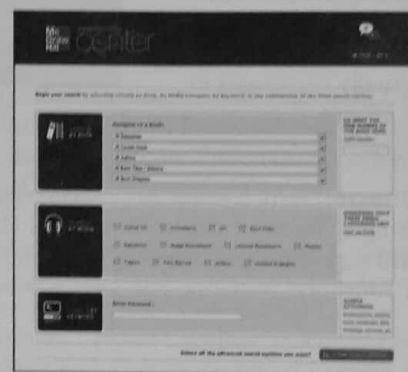
for *Concepts in Biology*, Thirteenth Edition, instructors can create and share course materials and assignments with colleagues with a few clicks of the mouse. For instructors, an Instructor's Manual, all PowerPoint lectures, and assignable content are directly tied to text-specific materials in *Concepts in Biology*. On the site is also a laboratory resource guide that correlates to the Laboratory Manual, active learning exercises, professional resources, and more. Instructors can also edit questions, import their own content, and create announcements and due dates for assignments.

ARIS has automatic grading and reporting of easy-to-assign homework, quizzing, and testing. All student activity within McGraw-Hill's ARIS is automatically recorded and available to the instructor through a fully integrated grade book that can be downloaded to Excel.

For students, there are pre- and post tests, animations, videos, key-term flashcards, case studies, and other materials that may be used for self-study or in combination with assigned materials.

Go to aris.mhhe.com to learn more and register!

Presentation Center



Build instructional materials wherever, whenever, and however you want! Presentation Center is an online digital library containing assets such as photos, artwork, animations, PowerPoints, and other types of media that can be used to create customized lectures, visually enhanced tests and quizzes, compelling course websites, or attractive printed support materials.

Access to your book, access to all books! This ever-growing resource gives instructors the power to utilize assets specific to their adopted textbook as well as content from other McGraw-Hill books in the library. Presentation Center's dynamic search engine allows you to explore by discipline, course, textbook chapter, asset type, or keyword. Simply browse, select, and download the files you need to build engaging course materials. All assets are copyright by McGraw-Hill Higher Education but can be used by instructors for classroom purposes.

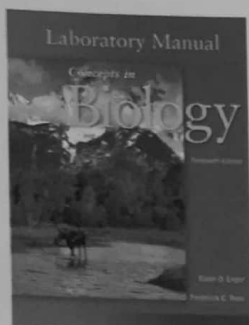
Instructor's Manual

The Instructor's manual contains an overview and a list of goals and objectives for each chapter.

Test Bank

A computerized test bank that uses testing software to quickly create customized exams is available on the website for this text. The user-friendly program allows instructors to search for questions by topic or format, edit existing questions or add new ones; and scramble questions for multiple versions of the same test. Word files of the test bank questions are provided for those instructors who prefer to work outside the test-generator software.

Laboratory Manual The laboratory manual features 30 carefully designed, class-tested learning activities. Each exercise contains an introduction to the material, step-by-step procedures, ample space to record and graph data, and review questions. The activities give students an opportunity to go beyond reading and studying to actually participate in the process of science.



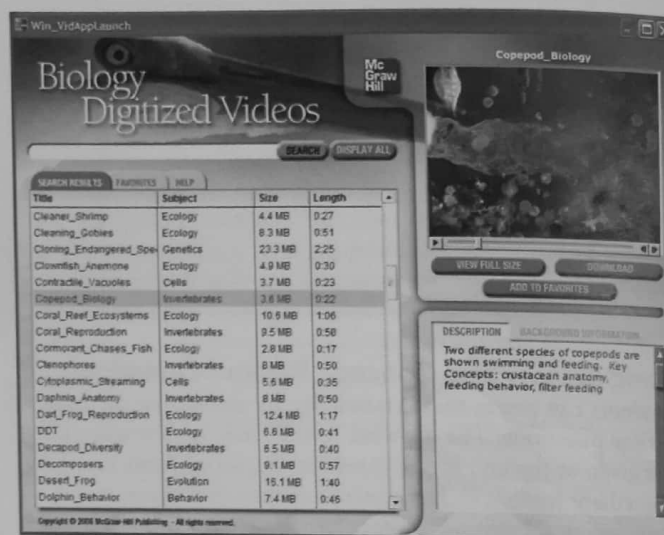
Course Management Systems ARIS content compatible with online course management systems like WebCT and Blackboard makes putting together your course website easy. Contact your local McGraw-Hill sales representative for details.

Electronic Books If you or your students are ready for an alternative version of the traditional textbook, McGraw-Hill and VitalSource have partnered to bring you innovative and inexpensive electronic textbooks. By purchasing E-books from McGraw-Hill & VitalSource, students can save as much as 50% on selected titles delivered on the most advanced E-book platform available, VitalSource Bookshelf.

E-books from McGraw-Hill & VitalSource are smart, interactive, searchable and portable. VitalSource Bookshelf comes with a powerful suite of built-in tools that allow detailed searching, highlighting, note taking, and student-to-student or instructor-to-student note sharing. In addition, the media-rich E-book for *Concepts in Biology* integrates relevant animations and videos into the textbook content for a true multimedia learning experience. E-books from McGraw-Hill & VitalSource will help students study smarter and quickly find the information they need. And they will save money. Contact your McGraw-Hill sales representative to discuss E-book packaging options.

ScienCentral Videos McGraw-Hill and ScienCentral, Inc. have teamed up to provide brief biology news videos for use in lecture or for student study and assessment purposes. A complete set of ScienCentral videos are located within this text's ARIS course management system, and each video includes a learning objective and quiz questions. These active learning tools enhance a biology course by engaging students in real life issues and applications such as developing new cancer treatments and understanding how methamphetamine damages the brain. ScienCentral, Inc., funded in part by grants from the National Science Foundation, produces science and technology content for television, video and the Web.

McGraw-Hill: Biology Digitized Video Clips



ISBN (13) 978-0-07-312155-0

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McGraw-Hill is pleased to offer adopting instructors a fabulous presentation tool—digitized biology video clips on DVD! Licensed from some of the highest-quality science video producers in the World, these brief segments range from about five seconds to just under three minutes in length and cover all areas of general biology from cells to ecosystems. Engaging and informative, McGraw-Hill's digitized biology videos will help capture students' interest while illustrating key biological concepts and processes such as mitosis, how cilia and flagella work, and how some plants have evolved into carnivores.

Photo Atlas for General Biology

ISBN (13) 978-0-07-284610-2

ISBN (10) 0-07-284610-0

This atlas was developed to support our numerous general biology titles. It can be used as a supplement for a general biology lecture or laboratory course.

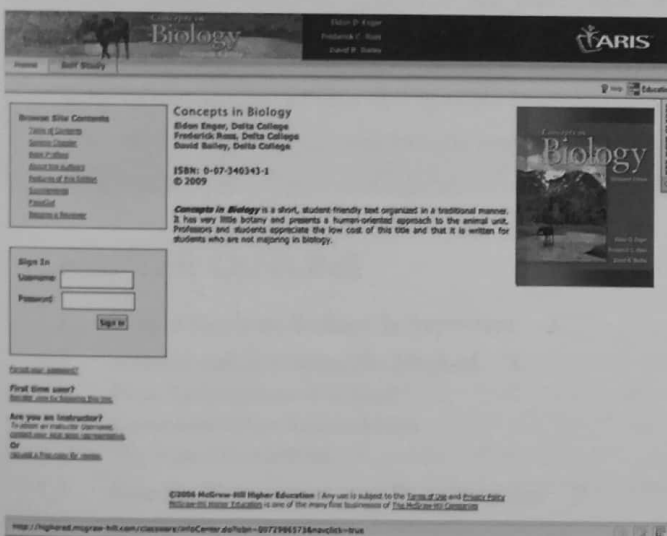
Learning Supplements for the Student

ARIS (Assessment Review and Instruction System)

Explore this dynamic website for a variety of study tools.

- Pre- and post-tests test your understanding of key concepts.
- BioTutorials animations and ScienCentral videos add relevancy to your study of biology.
- Flash cards ease learning of new vocabulary.
- Concept maps and Labeling activities aid in comprehension of important models.
- Experience This! connect the outside world to everything biology.
- Virtual labs let the student experience the laboratory without stepping foot into a classroom.
- Case Studies offer real-world applications to a variety of medical, ecological, and social issues.
- Downloadable audio and visual files make studying easy and convenient.

Go to aris.mhhe.com to learn more or go directly to this book's ARIS site at www.mhhe.com/enger13e.



How to Study Science

ISBN (13) 978-0-07-234693-0

ISBN (10) 0-07-234693-0

This workbook offers students helpful suggestions for meeting the considerable challenges of a science course. It gives practical advice on such topics as how to take notes, how to get the most out of laboratories, and how to overcome science anxiety.

Acknowledgments

A large number of people have helped us write this text. Our families continued to give understanding and support as we worked on this revision. We acknowledge the thousands of students in our classes who have given us feedback over the years concerning the material and its relevancy. They were the best possible sources of criticism.

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