Preface

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There are several things about this eleventh edition of *Concepts in Biology* that we find exciting. A major change is that David Bailey has joined the author team. David, a gifted teacher and valued colleague, was previously involved in many behind-the-scenes activities related to the Online Learning Center. With this edition he has taken on additional responsibilities for revising a portion of the text. 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. We feel the result is a readable, accurate, current, and interesting introduction to the science of biology.

The Eleventh Edition

Now in the eleventh edition, 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.

There are several structural changes in this eleventh edition:

- There are **more headings** to show relationships among topics and to divide material into easily digested sections.
- The former Key Concepts and Applications have been reorganized into **Goals and Objectives,** as suggested by several reviewers. Each objective is a measurable activity that allows students to assess their mastery of the material as they progress through a chapter.
- The **Learning Connections** at the end of each chapter have been reorganized and updated, and correspond precisely to the online study material. In addition, over 100 **new questions** have been written and many others were revised.
- **Cross-references** have been added throughout the text that call attention to related or background material located elsewhere in the text.
- A list of **prefixes, suffixes,** and **acronyms** has been added to the inside covers to serve as a ready reference and to help students master new vocabulary and appreciate the origin of many scientific words.

Three chapters were completely rewritten in this edition: **Chapter 2,** ***Simple Things of Life,*** provides a wider survey of chemistry topics. The chapter presents the basic concepts of energy and matter upon which later chapters will build as they explain biological structures and processes from the nature of cells to the complexity of ecosystems. To make these topics easier to follow, all topics dealing with chemistry or physics have been correlated with biological examples that should be familiar to most students.

Chapter 6, ***Biochemical Pathways,*** was reorganized to discuss processes common to both aerobic cellular respiration and photosynthesis. An overview of both respiration and photosynthesis is presented before each is discussed in more detail. Because of the differing desires of instructors, this material is organized into two different levels: fundamental and detailed. Care was taken to make sure that figures and their descriptions appear close to one another so that students can easily follow processes as they are described. New boxed readings discuss the evolution of photosynthesis and how knowledge of metabolic processes can be applied in developing herbicides and treating disease.

Chapter 7, ***DNA and RNA: The Molecular Basis of Heredity,*** has been rewritten to provide a better transition from enzymes and metabolism to cell division and inheritance. This new format stresses connections between the cell's need to reliably produce enzymes and the processes that regulate protein production. New terms and explanations have been added to help students identify with news items in the emerging fields of genomics and proteomics. As a result of the reorganization of these chapters, many new illustrations have been substituted for previous illustrations. Most of the remaining illustrations were modified as well.

There are many other changes throughout the text that strengthen the content and deal with emerging topics. Some of these include:

Part 2, *Cells: Anatomy and Action,* has additional material on the glycemic index, signal transduction in cells, the function of immune system cells, metabolic disorders and enzyme activity, and the nature of vitamins, cofactors, and coenzymes.

Part 3, *Cell Division and Heredity,* has new material on cell organelles, stem cells, cloning, the human genome project, and cystic fibrosis.

Part 4, *Evolution and Ecology,* was modified so that material on changes in beak sizes of Darwin's finches replaces the section on peppered moths. New material was added about the evolution of diseases such as SARS, monkey pox, and new strains of influenza. A new section on stabilizing, directional, and disruptive selection was added. The title of chapter 17 was changed to *Evolutionary and Ecological Aspects of Behavior* to more accurately reflect the content of the chapter. Also, changes were made in the headings and order of material to make it easier for the reader to follow.

Part 5, *Physiological Processes,* has new material on the molecular basis of obesity and measuring the caloric value of foods.

Part 6, *The Origin and Classification of Life,* has greatly modified sections on geologic time, AIDS, and cladistics. Additions include new material on microbes and biological warfare, sudden oak death, emerald ash borer, how antidiarrheal preparations work, and products obtained from plants. In addition, there have been changes in headings and organization to make the flow of material easier to follow.

Features

Each chapter in this text contains a number of features that actively involve students in the learning process:

Chapter Outline
At the opening of each chapter, the outline lists the major headings in the chapter as well as the boxed readings.

Goals and Objectives
The goals provide a general statement about the significance and importance of the material. The objectives give more precise directions to readers about what they should be able to do after studying the chapter.

Topical Headings
Throughout the chapter, headings subdivide the material into meaningful sections that help the reader recognize and organize information.

Full-Color Graphics
The line drawings and photographs illustrate concepts or associate new concepts with previously mastered information. Every illustration emphasizes a point or helps teach a concept.

How Science Works and Outlooks
Each of these boxed readings was designed to catch the interest of the reader by providing alternative views, historical perspectives, or interesting snippets of information related to the content of the chapter.

Cross References
Cross references have been added throughout that call attention to related or background material located elsewhere in the text. These guide students to review basic coverage as they study new topics and to see connections between concepts.

Chapter Summary
The summary at the end of each chapter clearly reviews the concepts presented.

Thinking Critically
This feature gives students an opportunity to think through problems logically and arrive at conclusions based on the concepts presented in the chapters. Guidelines to assist the student in thinking about these questions are found on the ***Online Learning Center.***

Concept Maps
Constructing concept maps provides students with an opportunity to strengthen their understanding of the chapter by organizing terms or ideas from the chapter into a logical relationship. Sample solutions and additional interactive concept maps for each chapter are found on the ***Online Learning Center.***

Key Terms
A list of 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 flashcards on the ***Online Learning Center.***

Learning Connections
Each chapter ends with Learning Connections that (1) provide review questions keyed to each major heading and (2) identify additional resources available on the ***Online Learning Center.***

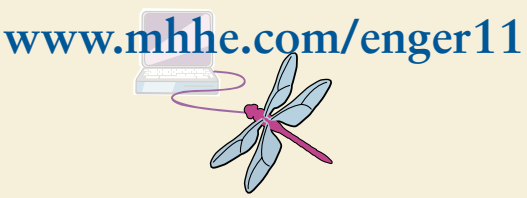
Student Support Materials

Online Learning Center

This online resource offers an extensive array of resources to support the learning experience, including the **Essential Study Partner,** a collection of interactive study modules. Other online resources include:

- Chapter multiple-choice quizzes with immediate feedback
- Animations and simulations to help students understand difficult concepts

- PowerWeb: Biology—A great resource for research papers; with weekly updates
- Interactive flashcards to help students learn key vocabulary terms
- Answers to questions and problems in the text
- Sample solutions for concept maps in the text, plus additional concept maps
- BioLabs to help students master skills vital to success in the laboratory with dynamically generated data, a thorough review, and a printable lab report
- Labeling Exercises, Case Studies, Key Points, Quick Overviews, and more!



Student Study Guide ISBN 0-07-284303-9

This student study guide provides an overview for each chapter as well as a set of learning activities. There is a focus on vocabulary terms and three types of questions to help students measure their achievement of the learning objectives for each chapter. These include short answer questions, label/diagram/explain activities, and multiple choice questions. Answers to all questions are provided in the Study Guide.

Laboratory Manual ISBN 0-07-255290-5

The Laboratory Manual features 29 carefully designed, class-tested exploratory investigations. Each exercise contains safety messages, an introduction to the material, step-by-step procedures, ample space to record and graph data, and review questions. The laboratory gives students an opportunity to "get their hands into biology," going beyond reading and studying to actually enter into the process of doing science.

Instructor Support Materials

Digital Content Manager

This easy-to-use instructor's CD-ROM contains every piece of line art and many of the photographs and tables from the text in both a .jpg format and a PowerPoint file that allows you to easily integrate full-color images into your classroom presentations. In addition, you will find a library of 700 photos, arranged by topic. Finally, 60 pieces of McGraw-Hill's Active Art provided in a PowerPoint format allow you to visually build complex topics step-by-step in your classroom. Your Digital Content Manager puts you in control of a powerful set of image resources to engage students throughout your lectures.

Instructor's Testing and Resource CD

This CD-ROM provides powerful tools for creating exams utilizing Brownstone Diploma® testing software for Windows or Mac. The CD also contains Word files of the test bank that you can edit or print. In addition, the CD contains the Instructor's Manual and the Laboratory Resource Guide.

Instructor's Manual

For each chapter, the Instructor's Manual provides:

1. A brief narrative summarizing the chapter;
2. A list of the chapter goals and objectives that can be printed or used to create student handouts; and
3. A list of the overhead transparencies and DCM resources supporting that chapter.

The Instructor's Manual can be found on the Instructor's Testing and Resource CD-ROM and online in the Instructor's Edition of the Online Learning Center at www.mhhe.com/enger11.

Overhead Transparencies

A set of 150 full-color **transparencies** is available free to adopters of the eleventh edition of *Concepts in Biology*. This set includes tables and figures from the text.

Laboratory Resource Guide

The Laboratory Resource Guide provides information on acquiring, organizing, and preparing laboratory equipment and supplies. Estimates of the time required for students to complete individual laboratory experiences are provided, as well as answers to questions in the laboratory manual. The Laboratory Resource Guide can be found on the Instructor's Testing and Resource CD-ROM and online in the Instructor's Edition of the Online Learning Center at www.mhhe.com/enger11.

Online Learning Center

Instructors have access to all student materials available through the Online Learning Center. In addition, the Instructor's Edition of the OLC provides access to the Instructor's Manual, the Laboratory Resource Guide, concept map solutions, and links to other online professional resources.