

Preface

We are honored to present *Biology: A Global Approach*, which has been adapted from *Campbell Biology*, Twelfth Edition, for a global audience. For the last three decades, *Biology* has been the leading college text in the biological sciences. It has been translated into 19 languages and has provided millions of students with a solid foundation in college-level biology. This success is a testament not only to Neil Campbell's original vision but also to the dedication of hundreds of reviewers (listed on pages 29–33), who, together with editors, artists, and contributors, have shaped and inspired this work.

Our goals for the Twelfth Edition include:

- **supporting students** with new visual presentations of content and new study tools
- **supporting instructors** by providing new teaching modules with tools and materials for introducing, teaching, and assessing important and often challenging topics
- **integrating text and media** to engage, guide, and inform students in an active process of inquiry and learning

Our starting point, as always, is our commitment to crafting text and visuals that are accurate, are current, and reflect our passion for teaching biology.

New to This Edition

Here we provide an overview of the new features that we have developed for the Twelfth Edition; we invite you to explore pages 5–15 for more information and examples.

- **NEW! Chapter Openers Re-envisioned.** Catalyzed by feedback from students and instructors, informed by data analytics, and building on the results of science education research, we have redesigned the opening of every chapter of the text. The result is more visual, more interactive, and more engaging. In place of an opening narrative, the first page of each chapter is organized around three new elements that provide students with the specific tools and approaches needed to achieve the learning objectives of that chapter:
 - **NEW! Visual Overview.** Centered on a basic biological question related to the opening photo and legend, the Visual Overview illustrates a core idea of the chapter with straightforward art and text. Students get an immediate sense of what the chapter is about and what kinds of thinking will underlie its exploration.
 - **NEW! Study Tip.** Just as the Visual Overview introduces students to *what* they will learn, the study tip offers guidance in *how* to learn. It encourages students to learn actively through such proven strategies as drawing a flow chart, labeling a diagram, or making a table. Each tip provides an effective strategy for tackling important content in the chapter.



- **NEW! Highlights of Digital Resources.** In conversations with users of the textbook, we often encounter a limited awareness of the digital tools the text provides to facilitate instruction and learning. We therefore created *Go to Mastering Biology*, a chapter opener section where we highlight some of the tutorials, animations, and other interactives available for students to explore on their own or for instructors to assign. These resources include Get Ready for This Chapter questions, Figure Walkthroughs, HHMI BioInteractive videos, Ready-to-Go Teaching Modules, and more.
- **NEW! Updated Content.** As in each new edition of *Biology*, the Twelfth Edition incorporates new content, summarized on pages 19–21. Content updates reflect rapid, ongoing changes in knowledge about climate change, genomics, gene-editing technology (CRISPR), evolutionary biology, microbiome-based therapies, and more. In addition, Unit 7 includes a new section on “Biological Sex, Gender Identity, and Sexual Orientation in Human Sexuality,” which provides instructors and students with a thoughtful, clear, and current introduction to topics of tremendous relevance to biology, to student lives, and to current public discourse and events.
- **5 NEW! Ready-to-Go Teaching Modules.** The Ready-to-Go Teaching Modules provide instructors with active learning exercises and questions to use in class, plus Mastering Biology assignments that can be assigned before and after class. A total of 15 modules are now available in the Instructor Resources area of Mastering Biology.

Pearson eText

Students using the Pearson eText will reap all the benefits of the new text features, while also benefiting from the following new and existing interactive resources:

- **NEW!** An expanded collection of the popular **Figure Walkthroughs** guide students through key figures with narrated explanations and figure mark-ups that reinforce important points.
- **NEW!** Links to the **AAAS Science in the Classroom** website provide research papers from *Science* with annotations to help students understand the papers. These links are included at the end of each appropriate chapter.
- **EXPANDED! 500 animations and videos** bring biology to life. These include new resources from **HHMI BioInteractive** that engage students in topics from CRISPR to coral reefs.

- Links to **Interviews** from all editions of *Biology* are included in the chapter where they are most relevant. The interviews show students the human side of science by featuring diverse scientists talking about how they became interested in biology and what inspires them.

For more information, see pages 8–10.

Mastering Biology

Mastering Biology provides valuable resources for instructors to assign homework and for students to study on their own:

- **Assignments.** Mastering Biology is the most widely used online assessment and tutorial program for biology, providing an extensive library of thousands of tutorials and questions that are graded automatically.
 - **NEW! Early Alerts** give instructors a quick way to monitor students' progress and provide feedback, even before the first test.
 - **NEW! AAAS Science in the Classroom** journal articles can be assigned with automatically graded questions.
 - Hundreds of self-paced **tutorials** provide individualized coaching with specific hints and feedback on the most difficult topics in the course.
 - Optional **Adaptive Follow-up Assignments** provide additional questions tailored to each student's needs.
- **Pearson eText.** The Pearson eText, described above, can be directly accessed from Mastering Biology.
- **Dynamic Study Modules.** These popular review tools can be assigned, or students can use them for self-study.
- **Study Area.** Media references in the printed book direct students to the wealth of online self-study resources available to them in the Mastering Biology Study Area, including Figure Walkthroughs, videos, animations, Get Ready for This Chapter, Practice Tests, Cumulative Test, and more.
- **Instructor Resources.** This area of Mastering Biology provides one-stop shopping for Ready-to-Go Teaching Modules, PowerPoints, Clicker Questions, animations, videos, the Test Bank, and more.

For more information, see pages 14–15 and 25–26 and visit www.masteringbiology.com.

Our Hallmark Features

Teachers of general biology face a daunting challenge: to help students acquire a conceptual framework for organizing an ever-expanding amount of information. The hallmark features of *Biology* provide such a framework, while promoting a deeper understanding of biology and the process of science. As such,

they are well-aligned with the core competencies outlined by the **Vision and Change** national conferences, organized by the American Association for the Advancement of Science, where hundreds of biologists met to discuss the needs of undergraduate biology. Furthermore, the core concepts defined by Vision and Change have close parallels in the unifying themes that are introduced in Chapter 1 and integrated throughout the book.

Chief among the themes of both Vision and Change and *Biology* is **evolution**. Each chapter of this text includes at least one Evolution section that explicitly focuses on evolutionary aspects of the chapter material, and each chapter ends with an Evolution Connection Question and a Write About a Theme Question.

To help students distinguish “the forest from the trees,” each chapter is organized around a framework of three to seven carefully chosen **Key Concepts**. The text, Concept Check Questions, Summary of Key Concepts, and Mastering Biology resources all reinforce these main ideas and essential facts.

Because text and illustrations are equally important for learning biology, **integration of text and figures** has been a hallmark of *Biology* since the First Edition. The new Visual Overviews, together with our popular Visualizing Figures, Exploring Figures, and Make Connections Figures, epitomize this approach.

To encourage **active reading** of the text, *Biology* includes numerous opportunities for students to stop and think about what they are reading, often by putting pencil to paper to draw a sketch, annotate a figure, or graph data. Answering these questions requires students to write or draw as well as think and thus helps develop the core competency of communicating science.

Finally, *Biology* has always featured **scientific inquiry**. The inquiry activities provide students practice in applying the process of science and using quantitative reasoning, addressing core competencies from Vision and Change.

Our Partnership with Instructors and Students

The real test of any textbook is how well it helps instructors teach and students learn. We welcome comments from both students and instructors. Please address your suggestions to:

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