

Preface

To the Student

Is it acceptable to clone humans? When does human life begin? What should be done about our warming planet? Who owns living organisms? What are our responsibilities toward endangered species? Having taught this course for nearly 45 combined years, we understand that no amount of knowledge alone will provide satisfactory answers to these questions. Addressing them requires the development of a scientific literacy that surpasses the rote memorization of facts. To make decisions that are individually, socially, and ecologically responsible, you must not only understand some fundamental principles of biology but also be able to use this knowledge as a tool to help you analyze ethical and moral issues involving biology. This is the aim of this textbook.

To help you understand biology and apply your knowledge to an ever-expanding suite of issues, we have structured each chapter of *Biology: Science for Life* around a compelling story in which biology plays an integral role. Through the story you not only will learn the relevant biological principles but also will see how science can be used to help answer complex questions. As you learn to apply the strategies modeled by the text, you will also be strengthening your critical thinking skills.

Even though you may not be planning to be a practicing biologist, well-developed critical thinking skills will enable you to make better decisions about issues that affect your own life and form well-reasoned, fact-based opinions about personal, social, and ecological issues.

To the Instructor

You are probably all too aware that teaching nonmajors students is very different from teaching biology majors. You know that most of these students will never take another formal science course; therefore, your course may be the last chance for these students to appreciate how biology is woven throughout the fabric of their lives and to develop a deep understanding of the process of science. You recognize the importance of engaging nonmajors because you know that these students will one day be voting on issues of scientific importance, holding positions of power in the community, serving on juries, and making health care decisions for themselves and their families. This text is designed to help you reach your goals.

By now, most nonmajors biology instructors are aware that this book differs from other books in that we use a compelling storyline woven throughout the entire text of each chapter to garner student interest. Once we

draw students in, we keep them engaged by returning to the storyline again and again until the end of the chapter, when students should be able to form their own data-driven opinions about each topic. Storylines are carefully crafted to allow the same depth and breadth of coverage as any other nonmajors biology text.

Our experience has taught us that students will not remember as many facts as we hope they will, but they can and do remember how to apply the scientific method to novel questions involving biology, and they can retain a strong appreciation for how science differs from other methods of understanding the world. To ensure our students leave our course with the ability to critically evaluate information they may come across, this text focuses heavily on the process of science, providing opportunities for students to practice applying the scientific method and analyze data at every opportunity.

New to the Sixth Edition

The positive feedback obtained in previous editions assured us that presenting science alongside a story works for students and instructors alike. In the sixth edition, we have added several new features, a new chapter, and several reorganized chapters. We also updated storylines and continued to improve popular features from previous editions as well as our supplements.

New Features: Got It?, Show You Know, Go Find Out, Make the Connection, and The Big Question

In this edition, we have added many active learning features to help engage student readers. Each text section includes a series of fill-in-the-blank **Got It?** questions to help students actively assess their content comprehension. The Chapter Review Summary now contains **Show You Know** questions to make reviewing the summary a more active process for students. **Go Find Out** includes activities students can perform on their own or in class in groups that challenge them to find information to answer contemporary questions. The Chapter Review ends with a **Make the Connection** exercise where students draw lines between statements about the storyline and the science in the chapter to help enhance their understanding. Lastly, each chapter ends with **The Big Question**, a feature that presents a topic, followed by some smaller questions—some answerable by science and some not. Once students determine which of the smaller questions science can

answer, data is presented related to one of these questions. Students analyze the data in light of both the smaller question addressed and the big question that headlines the feature.

Revised Unit One Coverage and New Chapters

Because we have found that our students are interested in their own fertility, we have reorganized the mitosis and meiosis chapter into two separate chapters. **Chapter 6** still deals with mitosis and cancer, but a new **Chapter 7** now addresses human fertility and reproduction along with meiosis. **Chapter 8** discusses Mendelian genetics in a new storyline, addressing the development and use of newborn screening tests. A newly reorganized **Chapter 9** uses the storyline of wrongful convictions to help students learn about the inheritance of complex traits such as those used in identification of suspects by witnesses. In addition, the heritability section helps counter the notion that criminals are born not made, and the DNA profiling section explains how positive identification has been used to exonerate many wrongfully convicted individuals.

Updated Storylines

In addition to the new storylines listed above associated with content revisions, we've revised the storylines of some chapters without strongly modifying content. **Chapter 5** continues to address photosynthesis within a storyline about global climate change, but is updated to reflect humanity's response via the Paris Agreement. Our chapter on speciation (**Chapter 13**) still addresses the issue of supposed human races, but now through the lens of swimmer Simone Manuel's historic gold medal in the 2016 Olympics. The chapter covering climate and biomes (**Chapter 17**) now addresses the concept of the human "footprint."

Supplements and Media

The supplements package continues to be updated and expanded by Judi Roux, Ed.D., a talented college instructor with years of classroom experience in nonmajors biology and colleague of Colleen Belk at the University of Minnesota Duluth. We think you will find that the supplements she has developed are brimming with ideas for how to reach this particular population of students. In addition to the Instructor's Manual (for use in traditional lectures as well as flipped classrooms) and a test bank, we also provide slides, animation, and videos to enrich instruction efforts. Available online, the *Biology: Science for Life* resources are easy to navigate and support a variety of learning and teaching styles. Judi authored not only the Instructor Guide, but also many Mastering Biology Quiz and Test Items and the PowerPoint lectures as well.

New features in Mastering Biology include **figure walk-throughs** on tough topics, which provide students with the dynamic guidance of the authors to help them solidify their understanding of the concepts within challenging illustrations. **Ready-to-Go Teaching Modules** for select chapters provide instructors with assignments to use before and after class, as well as in-class activities that use Clickers or Learning Catalytics for assessment. Each Ready-to-Go Teaching Module also includes an **Instructor How-To** video, in which Colleen and Virginia provide additional background and helpful hints for presenting the content in the context of particular storylines.

We believe you will find that the design and format of this text and its supplements will help you meet the challenge of helping students both succeed in your course and develop science skills—for life.

We look forward to learning about your experience with *Biology: Science for Life*, Sixth Edition.