Preface

Throughout our lives, we are called upon to make important decisions based on our understanding of science, whatever that understanding may be. This book was designed and written specifically for students who do not intend to become biologists and may never again take another science course. It is an accessible and engaging introduction to biology that provides future decision-makers with a basic understanding of biology and the process of science.

Accessible Text Understanding stems mainly from making connections between concepts and details, so a text with too little detail reads as a series of facts that beg to be memorized. However, too much detail overwhelms the introductory student. Thus, we authors are constantly trying to strike the perfect balance between level of detail and accessibility. We revised every page of this edition to pare detail to the minimum level we felt was necessary for the student to be able to make connections. We also know that English is a second language for many students, so we wrote in a clear and straightforward style.

This edition includes many analogies to familiar objects and phenomena that will help students understand abstract concepts. For example, in the discussion of covalent bonding in Chapter 2 (Molecules of Life), we explain that sharing electrons links two atoms, just as sharing earphones links two friends. A graphic of linked listeners (*right*) reinforces the explanation in the text.

A Wealth of Applications This book is packed with examples of applications that are relevant to a student's daily life (as marked by red squares in the index). At every opportunity, discussions of biological processes are enlivened by references to their effects on human health and the environment. Each chapter begins with an **IMPACTS/ISSUES** section that explores a current event or controversy directly related to the chapter's content. For example, in Chapter 2, a discussion of *trans* fats and their effects on health introduces the structure–function relationship of molecules. The introductory topic is integrated into the chapter material and the new **IMPACTS/ISSUES REVISITED** section that ends each chapter. This ending section uses chapter content to reinforce and expand the topic presented in the opening essay. In chapter 2, for example, we link the function of hydrolysis enzymes to the unhealthy effects of *trans* fats. We also pose an associated **HOW-WOULD-YOU-VOTE QUESTION** that gives students the opportunity to practice making an informed choice about a science-related controversy. The student web site provi to articles and other material that the student can use sidering the question.

Emphasis on the Process of Science T out the book, descriptions of current research and pho scientists who do it drive home the message that scien ongoing endeavor carried out by a diverse community For example, Chapter 5 (Capturing and Releasing Ener cusses the biofuels research of two young scientists at N Carolina State University (*right*). Research topics include not only what researchers have already discovered, but also how discoveries were made, how our understanding has changed over time, and what remains under investigation.

To strengthen a student's analytical skills and offer insight into contemporary research, each chapter now i an exercise on **DIGGING INTO DATA**. The exercise c of a short text passage—usually about a published scien experiment—and a table, chart, or other graphic that pr experimental data. The student can use information in and graphic to answer a series of questions.

In-Text Learning Tools To facilitate learning, chapter consists of several numbered sections that conta manageable chunk of information. Every section ends w boxed **TAKE-HOME MESSAGE** in which we pose a qu that reflects the critical content of the section, and then the question in bulleted list format. Every chapter has at one **FIGURE IT OUT QUESTION** with an answer imm ately following. These questions allow students to quickl their understanding as they read. Mastering scientific vo challenges many students, so we have included an **ON-P GLOSSARY** of key terms introduced in each two-page s in addition to a complete glossary at the book's end. The chapter material features a **VISUAL SUMMARY** that re each chapter's key concepts. A **SELF-QUIZ** poses multipl and other short answer questions for self-assessment (ans in Appendix I). A set of more challenging **CRITICAL TH ING QUESTIONS** provides thought-provoking exercises motivated student.

Design and Content Revisions Previous ado of *Biology: Today and Tomorrow* will notice that this editio tures a dramatically different design. Each chapter now o with a stunning piece of art designed to encourage stude est in the chapter's topic. The art is also used to illustrate the concepts within the chapter. A one-column design gi book a simple look, and it allows placement of the on-pa sary. The following list highlights some of the revisions t

chapter. A page-by-page guide to revised content and figures is available upon request from your sales representative.

Introduction - Chapter 1 has a new Impacts/Issues section about the discovery of new species, and a new section on critical thinking. Expanded discussions of philosophy and process of science.

Unit I How Cells Work
- Chapter 2 has a new Impacts/Issues section about *trans* fats.
- Chapter 3 has a new Impacts/Issues section about foodborne *E. coli* O157:H7.
- Chapter 4 sections on energy and metabolism have been reorganized and rewritten. The new Impacts/Issues Revisited section covers alcohol metabolism and alcoholic liver disease.
- Chapter 5 now has integrated coverage of photosynthesis and energy-releasing pathways. A new Impacts/Issues about biofuels opens the chapter, and the Impacts/Issues Revisited section introduces the problem of rising atmospheric carbon dioxide.

Unit II Genetics - Material within this unit has been rearranged.
- Chapters 6 describes the structure of chromosomes, and discusses the structure and function of DNA.
- Chapter 7 covers gene expression. Gene control material reworked to focus on human examples such as breast cancer.
- Chapter 8 covers mitosis and meiosis. Revised mitosis spread juxtaposes photos of mitosis in animal and plant cells.
- Chapter 9 covers inheritance. Revised Impacts/Issues section shows a panel of young victims of cystic fibrosis. Tracking traits section has a new essay about human skin color.
- Chapter 10 covers genetic engineering. Content has been simplified and updated with current information and examples.

Unit III Evolution and Diversity - Material within this unit has been rearranged.
- Chapter 11 covers Darwin's theory and evidence of evolution. Transitional fossils and comparative embryology photo series added. New spread visually correlates sedimentary rock layers in the Grand Canyon with periods in the geologic time scale.
- Chapter 12 covers processes of evolution (microevolution, speciation, macroevolution) and classification systems. Revised and expanded coverage of reproductive isolation, cladistics.
- Chapter 13 covers prokaryotes, protists, and viruses. Impacts/Issues section now focuses on the causes of AIDS and malaria.
- Chapter 14 now covers plants and fungi. It opens with an Issues/Impacts section about Nobel Prize winner Wangari Maathai's efforts to replant trees and slow deforestation.
- Chapter 15 has a revised Impacts/Issues section that includes information about additional early bird fossils. New material added about placazoans. Birds are now discussed under the Reptile subhead. Human evolution has been updated to include a discussion of *H. floresiensis*.
- The chapter comparing plants and animals has been deleted

Unit IV Ecology - The order of material within this unit has b altered and the chapter about animal behavior has been dele
- Chapter 16 covers population ecology and has a new Impa Issues about population explosions of Canada geese.
- Chapter 17 covers communities and ecosystems, previously covered in two separate chapters.
- Chapter 18 covers the biosphere and human effects. It ope with a new Impacts/Issues about threats to the Arctic and includes increased coverage of global climate change.

Unit V How Animals Work
- Chapter 19 has an updated Impacts/Issues section about st cells. Homeostasis and thermoregulation now covered here.
- Chapter 20 has a new Impacts/Issues section about myost and muscle bulk. Improved coverage of joint, muscle disord
- Chapter 21 has more concise coverage of circulation and respiration.
- Chapter 22 has simplified coverage of immunology and a Impacts/Issues section about the HPV vaccine.
- Chapter 23 has simplified coverage of urine formation.
- Chapter 24 discussion of the spinal cord now includes re pathways. Discussion of memory deleted.
- Chapter 25 includes information about role of thymus in melatonin's cancer-suppressing effects, effects of phthalate
- Chapter 26 has expanded and updated coverage of pregn fertility, and sexually transmitted diseases.

Unit VI How Plants Work
- Chapter 27 has a new Impacts/Issues section about phyt remediation.
- Chapter 28 has a new Impacts/Issues section about colo lapse disorder. Expanded, revised asexual reproduction se

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Martin Jose Garcia Ramos, Los Angeles City College
J. Phil Gibson, University of Oklahoma
Judith A. Guinan, Radford University
Carla Guthridge, Cameron University
Robert H. Inan, Inver Hills Community College
Dianne Jennings, Virginia Commonwealth University
Ross S. Johnson, Chicago State University
Paul Kaseloo, Virginia State University
Ronald R. Keiper, Valencia Community College West
Dawn G. Keller, Hawkeye Community College
Rahul H. Kuddus, Utah Valley State College
Vic Landrum, Washburn University
Lisa Maranto, Prince George's Community College
Kevin C. McGarry, Keiser University, Melbourne
Timothy Metz, Campbell University
Alexander E. Olvido, John Tyler Community College
Joshua M. Parke, Community College of Southern Nevada
Elena Pravosudova, Sierra College
Nathan S. Reyna, Howard Payne University
Carol Rhodes, Cañada College
Todd A. Rimkus, Marymount University
Laura H. Ritt, Burlington County College
Lynette Rushton, South Puget Sound Community College
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Sehoya Cotner, University of Minnesota
Heather Collins, Greenville Techincal College
Joe Conner, Pasadena Community College
Gregory A. Dahlem, Northern Kentucky University
Juville Dario-Becker, Central Virginia Community College
Jean DeSaix, University of North Carolina
Carolyn Dodson, Chattanooga State Technical Community C
Kathleen Duncan, Foothill College, California
Dave Eakin, Eastern Kentucky University
Lee Edwards, Greenville Technical College
Linda Fergusson-Kolmes, Portland Community College
Kathy Ferrell, Greenville Technical College
April Ann Fong, Portland Community College
Kendra Hill, South Dakota State University
Adam W. Hrincevich, Louisiana State University
David Huffman, Texas State University, San Marcos
Peter Ingmire, San Francisco State
Ross S. Johnson, Chicago State University
Rose Jones, NW-Shoals Community College
Thomas Justice, McLennan Community College
Jerome Krueger, South Dakota State University
Dean Kruse, Portland Community College
Dale Lambert, Tarrant County College
Debabrata Majumdar, Norfolk State University
Vicki Martin, Appalachian State University
Mary Mayhew, Gainesville State College
Roy Mason, Mt. San Jacinto College
Alexie McNerthney, Portland Community College
Brenda Moore, Truman State University
Alex Olvido, John Tyler Community College
Molly Perry, Keiser University
Michael Plotkin, Mt. San Jacinto College
Amanda Poffinbarger, Eastern Illinois University
Johanna Porter-Kelley, Winston-Salem State University
Sarah Pugh, Shelton State Community College
Larry A. Reichard, Metropolitan Community College
Darryl Ritter, Okaloosa-Walton College
Sharon Rogers, University of Las Vegas
Lori Rose, Sam Houston State University
Matthew Rowe, Sam Houston State University
Cara Shillington, Eastern Michigan University
Denise Signorelli, Community College of Southern Nevada
Jennifer Skillen, Community College of Southern Nevada
Jim Stegge, Rochester Community and Technical College
Andrew Swanson, Manatee Community College
Megan Thomas, University of Las Vegas
Kip Thompson, Ozarks Technical Community College
Steve White, Ozarks Technical Community College
Virginia White, Riverside Community College
Lawrence Williams, University of Houston
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