

# Preface to the Instructor

## ABOUT THE COVER

The life of the lesser long-nosed bat (*Leptonycteris curasoae*) and that of the majestic saguaro cactus (*Carnegiea gigantea*) are intimately linked in a relationship that benefits both organisms. The bat harvests needed energy and nutrients for its life activities from the cactus flower and, in the process, transfers the saguaro's gametes for sexual reproduction.

During spring and early summer, large saguaro flowers open precisely at dusk, a time when bats are most active. Each saguaro flower produces energy-rich nectar at the flower base. But to reach this nectar reservoir, the long-nosed bat must plunge its head into the flower. The bat's face emerges dusted with thousands of saguaro pollen grains, each of which contains the cactus's sperm gametes. When finished at one saguaro flower, the bat flies off to another saguaro and repeats its feeding ritual. Some of the pollen adhering to its face is transferred to the female part of the cactus flower, making it possible for the cactus's egg and sperm to fuse in fertilization to begin a new generation of saguaro offspring.



knows, is also the way science advances. We design this text to take advantage of our students' natural curiosity about themselves and the surrounding world of life. It is the same curiosity that motivates scientists to investigate the world of life, making discoveries that lead to understanding and often producing revolutionary technological advances.

The cover photograph of the bat and cactus also underscores two central biological themes that form the foundation of this text. First, the physical match between the size and shape of the saguaro flower and the size and shape of the bat's face and tongue

is the result of evolution—the fundamental process of change that leads to adaptations that ultimately increase an organism's chances of survival and reproduction. Second, the bat-saguaro relationship illustrates the interdependency of organisms, a fundamental theme that extends beyond bats and saguaros. All organisms ultimately depend on other organisms for the necessities of life. Humans depend on plants for food and oxygen; on other animals for food, work, and companionship; and on bacteria and fungi for recycling essential nutrients. As John Muir put it in his book *My First Summer in the Sierra*, "When we try to pick out anything by itself, we find it hitched to everything else in the universe."

Our primary goals in developing this book are to help college students regardless of their background in biology, understand the excitement and importance of scientific investigation and discovery; to provide them with the essential biological facts and concepts they will need to be informed citizens in an increasingly technological world; and to encourage that each student continue to build a better understanding and appreciation of the natural world.

## THE APPROACH

The elements of the approach are described in the upcoming section "To the Student: A User's Guide." The peda-

Why did we choose to put a bat and saguaro on the cover of our new text? Our hope is the photo will arouse student curiosity, prompting such questions as Why is the bat hovering over that flower? What kind of bat is it? What kind of flower is it? How do bats fly? We believe that by piquing curiosity, students become motivated to inquire more about the living world, and through inquiry, they will discover the fundamental concepts and many fascinating wonders of modern biology.

This philosophy—curiosity triggers inquiry, and inquiry leads to discovery—forms not only the pedagogical foundation for our brief textbook, but, as every biologist

gical features are embedded in a book that is written in an informal, accessible style that invites the reader to explore the process of biology. In addition, we have tried to help students make connections between the scientific facts and their everyday lives. One way to do this is to relate the fundamentals of biology to humans, revealing the human perspective in each biological principle, from biochemicals to ecosystems. With each such insight, students take a substantial step forward becoming the informed citizens that make up responsible voting public.

We hope that, through this textbook, we can become partners with the instructor and the student. The biology teacher's greatest asset is the basic desire of students to understand themselves and the world around them. Unfortunately, many students have grown detached from this natural curiosity. Our overriding objective in creating this book was to arouse the students' fascination with exploring life, building knowledge and insight that will enable them to make real-life judgments as modern biology takes on greater significance in everyday life.

## THE ART PROGRAM

Each photo was picked specifically for its relevance to the topic at hand and for its aesthetic and instructive value in illustrating the narrative concepts. The illustrations were carefully crafted under the guidance of the authors for accuracy and utility as well as aesthetics. The value of illustrations cannot be overlooked in a discipline as filled with images and processes as biology. Through the use of cell icons, labeled illustrations of pathways and processes, and detailed legends, the student is taken through the world of biology, from its microscopic chemical compo-

nents to the macroscopic organisms and the environments that they inhabit.

## SUPPLEMENTARY MATERIALS

In our continuing effort to meet all of your individual needs, we have developed an integrated supplements package that helps the instructor bring the study of biology to life in the classroom and that will maximize the students' use and understanding of the text.

The *Instructor's Manual*, developed by Michael Leboffe of San Diego City College, contains lecture outlines, transparency references, suggested lecture activities, sample concept maps, and answers to study guide questions.

Michael Leboffe developed the test bank, which consists of four types of questions: fill-in questions, matching questions, multiple-choice questions, and critical thinking questions. A computerized bank is also available.

A comprehensive visual ancillary package includes four-color transparencies (183 figures from the text), *Process of Science* transparency overlays that break down various biological processes into progressive steps, a video library consisting of tapes from Coronet MTI, and the *Bio Sci* videodisk series from Videodiscovery, covering topics in biochemistry, botany, vertebrate biology, reproduction, ecology, animal behavior, and genetics. Suggestions for integrating the videodisk material in your classroom discussions are available in the instructor's manual.

A comprehensive study guide and lab manual are also available and are described in more detail in the User's Guide section of the preface.