

INQUIRY

PREFACE

MY WRITING CAREER began with a study guide. I was an instructor of biology at a small community college where the emphasis was on teaching, not research, and the members of the Biology Department worked together to develop a course that reached out to science-shy students. We all believed in the human approach, and regardless of that week's topic, we sought human applications that would make the material more relevant to the student. After teaching for several years, I began to develop a methodology that enabled most students to learn biology. This resulted in handouts that I distributed in my own classes and made available to the other biology instructors. I tired of duplicating the handouts every morning and decided to put them in a printed Study Guide instead. The first edition of *Inquiry into Life* was based on that Study Guide.

My own background is highly traditional, and *Inquiry into Life* is a traditional text. The levels of biological organization serve as a guide, and the text begins with chemistry and ends with ecology. Students need to know not only about themselves but also about the other organisms that share this planet with us. Although the systems chapters in *Inquiry into Life* pertain to humans, the anatomy and physiology of other animals is discussed in the Animal Kingdom chapters. I firmly believe that students must develop an understanding and appreciation of how the biosphere works in order to make political decisions that will help the biosphere endure.

Biology has changed rapidly since *Inquiry into Life* was first published in 1976. New findings, ideas, and concepts have emerged over the years and created an excitement that I have always worked hard to convey. Still, we should remember that most students using *Inquiry into Life* are just beginning their study of biology and need a good foundation in basic principles. My goal is to blend the classic with the new, and I hope you will agree that this edition of *Inquiry into Life* is both time-tested and current.

Although I wrote the first edition of *Inquiry into Life* on a portable typewriter I had received as a gift, the text was digitized as soon as computers became generally available. Since that time, my technical proficiency has increased, and now I am able to page the book using desktop publishing software. In the first several editions of *Inquiry into Life* it was difficult, if not impossible, to have each illustration appear near its reference. Now, because I page the book, every illustration is on the same or facing page. This helps students enormously because they can read the text and see the illustration at the same time.

ILLUSTRATIONS

The illustrations in *Inquiry into Life* are developed with the utmost care. With the early editions, I had excellent artists

who were able to assist me in the development of an illustration before it was committed to paper. Now a member of my staff, Evelyn Jo Hebert, and I work on illustrations almost every day to make sure they will be both instructional and beautiful. A team of illustrators takes our rough sketches and turns them into the finished products that appear in the text. The results of this process are seen in the many new illustrations in this edition that make difficult subject matter more understandable.

THIS EDITION

The many changes and revisions in this edition are too numerous to review here, but these may be of special interest:

- In the introductory chapter, The Study of Life, new text and illustrations strengthen the presentation of the characteristics of life, the organization of the biosphere, and the scientific process. A new experiment regarding the use of artificial versus natural fertilizers serves as the basis for discussion of the scientific process.
- Chapter 8, Photosynthesis, in Part II has been reorganized and mostly rewritten. The terminology and illustrations are now more student friendly. The chapter begins with an overview of what types of organisms photosynthesize, and the new Figure 8.3 serves as an icon for the chapter.
- The genetics chapters in Part V have been reorganized to include a new chapter, Genetic Counseling (Chapter 26). This chapter shows how all aspects of genetics are involved in understanding and correcting our genetic inheritance. Chapter 24 now combines DNA biology with DNA technology to make a better connection between the two. Chapter 25, Control of Gene Expression and Cancer, includes a discussion of reproductive and therapeutic cloning, control of gene expression in bacteria and humans, and an expanded section regarding cancer treatment.
- Chapter 28, Microbiology, in Part VI not only covers the biology of viruses, bacteria, archaea, and fungi, but also discusses some of the major infectious diseases in humans. Chapter 29 is a much improved look at plant evolution and diversity.
- Chapter 36, Environmental Concerns, in Part VII is a new chapter that shows the relationship between consumption of resources and pollution and their effects on biodiversity.
- Many new chapter opening vignettes and boxed readings will capture students' interest.
- Additional review and study aids have been added to the end of each chapter. In addition to more Testing Yourself questions, there is a new Understanding the Terms section that lists all boldfaced terms in the chapter and gives the page number where each term is defined. Following the list is a matching exercise that allows students to test their understanding of the terms.

OVERVIEW OF CHANGES TO *INQUIRY INTO LIFE*, ELEVENTH EDITION

- **New Vignettes and Boxed Readings**
This edition includes many new vignettes and boxed readings to capture students' interest.
- **Revised Chapter 8: Photosynthesis**
This chapter has been reorganized and mostly rewritten. The terminology and illustrations are now more student friendly.
- **Revised Part V: Continuance of the Species**
This part has been reorganized to include a new chapter on Genetic Counseling (Chapter 26). Chapter 24 now combines DNA biology and DNA technology. Chapter 25, Control of Gene Expressions and Cancer, includes the latest information on cloning, gene expression, and cancer treatment.
- **Revised Part VI: Evolution and Diversity**
Chapter 28, Microbiology, now includes discussions on some of the major infectious diseases in humans.
- **Part VII: Behavior and Ecology**
A new chapter, Environmental Concerns (Chapter 36) shows the relationship between consumption of resources and pollution and their effects on biodiversity.
- **Additional Study Helps for Students**
Many new Testing Yourself questions have been added to the end of each chapter, as well as Understanding the Terms, a new section that helps students learn biology terminology.

Acknowledgments

It would be impossible for a single individual to publish a book of the quality of *Inquiry into Life*. I want to begin by thanking my associates at McGraw-Hill. It has been a pleasure to work with Tom Lyon, my editor; Margaret Horn, my developmental editor; and Jayne Klein, my production manager. We supported one another and urged each other on to reach a higher level of accomplishment than would have otherwise been possible.

The design of the book is the result of the creative talents of Wayne Harms, who also lent a hand when I was baffled over the best design for an individual illustration. In general, the illustration program was carried to completion by the artists at Imagineering who always cheerfully carried through on my many additional instructions. Lori Hancock and Connie Mueller did a superb job of tracking down those hard-to-find photographs we needed to finish off the illustrations.

My staff, consisting of Evelyn Jo Hebert and Beth Butler, faithfully applied their many talents to this text and its ancillaries. I could not have finished this edition without them. Textbook writing is very time consuming, and I have always appreciated the continued patience and encouragement of my family. By now, my children are grown, but they never fail to keep up with how I am progressing with my work. My husband, Arthur Cohen, himself a biology teacher, gives me considerable support each day and discusses with me the details of my work. His input is invaluable to me.

The draft for the first edition of *Inquiry into Life* was improved by the comments of my colleagues in the Biology Department, but my publisher soon requested input from instructors around the country, and so the process continues today. *Inquiry into Life* is the product of my own efforts and those of the many reviewers that gave me guidance on particular parts of the book. I am extremely grateful to these reviewers whose comments were so valuable as I worked on this edition:

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