

Preface

Thinking About Biology is designed for a one-semester, general biology course for non-majors. The topics and exercises are general enough to be compatible with any introductory-level human and general biology text. The activities demonstrate that basic biological concepts can be applied to a wide variety of plants, animals, and microorganisms.

This book is unique not because of the specific topics covered, but because of the approach to these topics. The laboratory exercises are planned to help you

- gain practical experience that will help you understand lecture concepts
- acquire the basic knowledge needed to make informed decisions about biological questions that arise in everyday life
- develop the problem-solving skills that will lead to success in college and in a competitive job market
- learn to work effectively and productively as a member of a team

The basis of scientific work is asking questions and answering them by making observations and conducting experiments. Thus, we strongly believe that the most important goal of an introductory course in the life sciences is to achieve some understanding of the processes of investigation that are basic to science, and how scientists work to solve problems—not to simply memorize facts about animals, molecules, or new techniques.

We hope that working through this laboratory manual will be an exciting experience for both students and instructors, and one that will leave you better prepared to meet the demands of our increasingly scientific society.

Wishing you an enjoyable and successful semester.



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NEW FOR THE FIFTH EDITION

New and revised activities for this edition were based on feedback from hundreds of students and a selection of faculty reviewers from around the United States. Among the key features, you'll find

- the exercises are broken into activities that are related to a particular topic—you can break up each exercise into blocks that fit your specific lab period
- new activities on molecular genetics, DNA barcoding, and blood typing
- cutting edge activities on forensic DNA analysis
- more information on important health issues
- revised assessment questions
- a reorganized table of contents
- new activities on cells, photosynthesis, and ecosystems
- a new evolution exercise
- more photos and diagrams

SPECIAL FEATURES FOR STUDENTS

Informal Style

- The text is written simply with easy-to-understand language. Key terms and important definitions are highlighted with bold print for easy recognition. Large spaces are provided throughout the manual for you to record and fully explain your answers.

Active Learning Experience

- Every exercise gives you an opportunity to be an investigator using the scientific method. You'll form hypotheses, set up experiments, collect data, record your data in graphs and charts, and draw conclusions from your experimental results.

Team-Building Opportunities

- Most laboratory activities emphasize a team approach. Group work is encouraged and often required. In the real-world job market, you'll be expected to interact with others to solve problems and complete projects. This approach provides opportunities for you to work together, share ideas, and function effectively in groups to accomplish tasks.

Real-Life Connections

- Lab activities are designed to stimulate interest in topics that can help you make decisions regarding your own health and nutrition, understand current topics in the news, and become informed about how your personal actions affect the environment.

Tools for Success

The following components of each exercise will help you succeed.

- **Instructional Objectives.** The objectives are listed first in each exercise so that you'll be able to focus your attention on the main concepts of each activity.
- **Content Focus.** Each exercise includes a brief discussion of the background information that you'll need to understand the subject of the exercise and to prepare you to complete the activities that follow.
- **Notes, Hints, and Cautions.** Note boxes provide helpful hints for solving problems and accomplishing laboratory tasks. Pay special attention to caution boxes that provide important safety information.
- **Comprehension Checks.** Stop and complete the Comprehension Check questions to get immediate feedback on your understanding of the basic principles covered in each activity. These questions also provide a chance for you to apply what you've learned to situations outside the classroom.
- **Check-off Boxes.** These boxes allow your instructor to check your progress and make sure you've understood the important concepts in each activity. This will help you focus your study time and be more successful in the course.
- **Self Tests.** Answer these questions after completing the laboratory exercise. The Self Test questions allow you to assess your comprehension and apply your knowledge. You can find the answers to the Self Test questions in Appendix 2 at the back of the book.

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REVIEWERS

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