

PREFACE

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WHY STUDY BOTANY?

The answer to the question *Why study botany?* differs, even among the three of us, and likely will be different from your answer; however, we feel that understanding plants is central to understanding life on earth and its evolution. Never before have so many people been concerned about the fragile, botanical wonders of this planet. With the exception of a few organisms at the bottom of the ocean and certain microorganisms, all other organisms rely on plants and algae directly or indirectly for their source of food and oxygen. Whether you think about plants or not, they are essential to your existence, and they form the foundation for all the interactions within terrestrial communities. It also may be surprising to learn that plants share many genes and characteristics with humans and other animals, and because of this, when we study plants, we learn about how other organisms function. Finally, plants are interesting organisms because of the diversity of habitats in which they live and the myriad of adaptations that have allowed them to survive.

THREE THEMES DEFINE THIS BOOK.

This textbook provides a basic background about the life of a plant and explains how plants affect the lives of humans. Within this framework, three themes emerged—evolution, ecology, and economic botany—illustrating how plants have evolved, what ecological roles they play in the world, and how species are economically important to humans. Evolution is a central theme of all biology, and the principles of natural selection operate on plants in similar ways to those of other organisms. In terms of ecology, plants and algae are the producers of most communities, and thus, to understand how animals and ecosystems function, a knowledge of plants is critical. Finally, plants are economically important because we eat, grow, wear, live in, and are healed and harmed by plants and their products on a daily basis. For these reasons and more, we find plants to be significant and interesting organisms, illustrative of the living world as a whole.

Focusing on these themes has allowed us to organize topics in the way we believe is most appropriate to understand plants, emphasizing form and function of plant structures. For instance, when we talk about the form of roots, we also discuss one of their important functions—absorbing minerals from the soil. Or, when we talk about the shape of leaves, we discuss how leaf form influences the function of transpi-

ration and movement of water in a plant. We begin this book with a description of natural selection, discuss evolution in detail near the end, and carry the discussion of both throughout the text in hopes you will ponder how structures and functions help plants survive and reproduce. We also begin with a discussion of important food and medicinal plants, conclude with appendices on biotechnology and chemistry, and include human uses of plants in every chapter and integrate ecological issues throughout the text. The use of themes is intended to help you organize information about plants, see that this information is connected, and understand that ideas build upon each other.

INQUIRY IS THE BASIS OF SCIENCE.

Throughout this book, you'll find questions—associated with photographs, opening the chapters, ending "Inquiry Summaries," and placed throughout the narrative. The questions are intended to pique interest and inspire further thought about the topic before continuing to read. Many of these questions have no single, correct answer; however, we hope there will be an attempt to answer them all. Science is not about correct answers and facts. Science is about making careful observations, asking good questions, and trying to answer the questions in a systematic and scientific way—science is a process of investigation. When all of us were younger, we asked many questions of our parents and teachers; children possess an innate curiosity about the natural world. Unfortunately, pre-college classes often inhibit student curiosity, and many students have become passive listeners and readers. Our goal is that our inquiry approach will re-spark an interest in the process of science. We hope that the information, ideas, and the many illustrations, references, and questions in this book will foster a new appreciation and respect for plants.

HELPFUL SUPPLEMENTS MAKE LEARNING EASIER.

1. An *Instructor's Manual* accompanies this text and provides chapter outlines, key terms, test and discussion questions, suggestions for class activities, and resources for teaching aids.
2. *Computerized Testing Software* offers the objective test questions that are in the *Instructor's Manual* in electronic format for ease in class testing and grading.

3. A set of 125 *transparencies* is available to users of the text. The acetates duplicate key figures from the text that are important to understanding major concepts in botany.
4. A comprehensive *website* (<http://www.mhhe.com/botany>) offers numerous resources for instructors and students alike via the *OnLine Learning Center*. The OLC includes live links to websites that provide more information on each chapter of the text, practice quizzing, key-term flashcards, animations, Internet activities, tips on writing term papers, career information, case studies, additional test questions, activities, sample syllabi, current global botanical issues, and much more.
5. *Botany Visual Resource Library CD-ROM*. This classroom presentation CD includes images from three botany textbooks and hundreds of photos and micrographs.

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We are also indebted to our many colleagues who have devoted hours from their busy schedules to help us fine-tune our several drafts into what you now hold in your hand. We were humbled by, and truly appreciative of, their valuable feedback; however, all errors are, of course, our responsibility.

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