

Dear Student:

Welcome to our world—the endlessly fascinating world of biology.

I can guess what some of you are thinking right now. “Fascinating? Yeah, right. Totally.” Well, give us—and biology—a chance to show you that the study of the natural world really is more exciting, more fascinating, and more important to you personally than you’ve ever realized. In fact, biology is more important to our daily lives today than it has ever been.

Why? Three words: “We are one.” This isn’t meant in a “touchy-feely” or “New Age” way. “We” includes all forms of life on Earth. And “are one” means that all of us are tied together more tightly, in more different ways, than anyone imagined until recently.

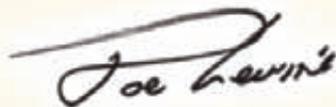
Both our “hardware” (body structures) and our “software” (genetic instructions and biochemical processes that program body functions) are incredibly similar to those of all other living things. Genetic instructions in our bodies are written in the same universal code as instructions in bacteria and palm trees. As biologists “read” and study that code, they find astonishingly similar processes in all of us. That’s why medical researchers can learn about human diseases that may strike you or your family by studying not only apes and pigs and mice, but even yeasts. We are one on the molecular level.

All organisms interact with one another and with the environment to weave our planet’s web of life. Organisms make rain forests and coral reefs, prairies and swamps—and farms and cities. We interact, too, with the winds and ocean currents that tie our planet together. Human activity is changing local and global environments in ways that we still don’t understand ... and that affect our ability to produce food and protect ourselves from diseases. We are one ecologically with the rest of life on Earth.

All organisms evolve over time, adapting to their surroundings. If humans alter the environment, other organisms respond to that change. When we use antibiotics against bacteria, they develop resistance to our drugs. If we use pesticides against insects, they become immune to our poisons. We are one in our ability to evolve over time.

Those are the kinds of connections you will find in this book. Microscopic. Enormous. Amusing. Threatening. But always fascinating. That’s why—no matter where you start off in your attitude about biology—we think you are in for some surprises!

Sincerely,



Dear Student,

*Biology is one of the subjects you're going to study this year, but I hope you'll realize from the very first pages of this book that biology is a lot more than just a "subject." Biology is what makes an eagle fly, a flower bloom, or a caterpillar turn into a butterfly. It's the study of ourselves—of how our bodies grow and change and respond to the outside world, and it's the study of our planet, a world transformed by the actions of living things. Of course, you might have known some of this already. But there's something more—you might call it a "secret" that makes biology unique.*

*That secret is that you've come along at just the right time. In all of human history, there has never been a moment like the present, a time when we stood so close to the threshold of answering the most fundamental questions about the nature of life. You belong to the first generation of students who can read the human genome almost as your parents might have read a book or a newspaper. You are the first students who will grow up in a world that has a chance to use that information for the benefit of humanity, and you are the very first to bear the burden of using that knowledge wisely.*

*If all of this seems like heavy stuff, it is. But there is another reason we wrote this book, and we hope that is not a secret at all. Science is fun! Biologists aren't a bunch of serious, grim-faced, middle-aged folks in lab coats who think of nothing but work. In fact, most of the people we know in science would tell you honestly, with broad grins on their faces, that they have the best jobs in the world. They would say there's nothing that compares to the excitement of doing scientific work, and that the beauty and variety of life make every day a new adventure.*

*We agree, and we hope that you'll keep something in mind as you begin the study of biology. You don't need a lab coat or a degree or a laboratory to be a scientist. What you do need is an inquiring mind, the patience to look at nature carefully, and the willingness to figure things out. We've filled this book with some of the latest and most important discoveries about living things, but we hope we've also filled it with something else: our wonder, our amazement, and our sheer delight in the variety of life itself. Come on in, and enjoy the journey!*

Sincerely,

*Ken Miller*

