Preface

This book is about teaching content literacy. More specifically, it is about teaching *science* content literacy, a realm of instruction that has sometimes been neglected by educators who place all focus on science content instruction. While we realize that it is indeed necessary to emphasize an understanding of content, we strongly feel that a focus on the specific literacy requirements of those who read, write, and talk about science is of equal import and a perfect companion to content instruction. Does this mean that we think all citizens should have some degree of science literacy? Absolutely! Consider the fact that the November 2008 elections had several key environmental initiatives for voters across the country to weigh in on. In Missouri, the voters had to decide about Proposition C, The Missouri Clean Energy Initiative, which would require the state's investor-owned electric utilities to generate or purchase two % of their electricity from renewable sources (wind, solar, biomass—including ethanol and hydropower) by the year 2011. The standard would gradually increase to 15 % by 2021. Coloradoans decided on the fate of Amendment 58, an initiative to remove a tax credit for oil and gas producers. The revenue would instead be allocated for a few select social and environmental purposes. Minnesota and California had similar environmental issues to consider as well. To be a well-informed voter, one must be able to read about an issue. Occasionally, a voter may even be called on to either write about or deliberate on the pros and cons as well. It is likely that science-related issues will continue to take the stage at election time and will often be the central focus of community forums. Today, there are citizens across the country debating issues related to drought (California has been facing this dilemma for years now), water and land pollution, ocean dumping, and environmental waste and disposal.

These are just a few of the concerns of people across the globe. It is everyday citizens, including the young people sitting in our classrooms, who have the right and the responsibility to help make these critical decisions today and well into the future. Given this, science educators can do a great service by helping their students learn to access science content in a

way that fosters discussion, reflection, and authorship. Additionally, it's important to keep in mind that students who can read, write, and talk about science can go beyond the content presented in earth science or biology class. They are better able to pick up and read a newspaper article about the eruption of a Columbian volcano or contribute to a conversation about genetic engineering in an informed, knowledgeable way. Science literacy goes beyond the instruction of content. It enables students to continue to learn, reflect, and communicate about science issues throughout their lives. And clearly, science will continue to dominate our realm of existence in increasingly more powerful ways over the coming years.

As a way to frame science literacy instruction, we have considered Shanahan and Shanahan's (2008) model of literacy progression. This model views content literacy as a pinnacle sitting on top of a base that includes basic and intermediate literacy skills. Science content literacy, a specific type of disciplinary literacy, requires that a reader view a text from a framework that allows for predictions, questioning that goes beyond the text, and the possibility of experimentation. It requires readers to access background knowledge and to look for data and conclusions. Typically, science readers will move back and forth between text and charts or graphs, paying specific attention to trends and patterns. This specific lens of viewing and responding makes a science reader and science writer different from a history or English language arts reader or writer. It is what has inspired the authorship of this book. You'll notice that there are margin notes designed to clue you in to the aspects of disciplinary literacy that are central to the chapters. Additionally, you'll find a progression in the chapter sequence that will allow the reader to focus on what's important to think about at the start (Chapter 1—"The Role of Language in Science" and Chapter 2—"Developing and Activating Background Knowledge"), what's important to think about in terms of instruction (Chapter 3—"Integrating Vocabulary Instruction Into the Science Classroom," Chapter 4—"Reading Science Texts," and Chapter 5—"Writing In Science: Scaffolding Skills For Science Students"), and what's critical to an understanding of student learning and teacher instruction (Chapter 6—"Assessing Student Learning in Science").

Because this book is intended for secondary teachers—middle school, junior high, and high school educators who teach a variety of science classes—we have provided examples of instructional tools from both the physical and biological fields. Chapter 1, "The Role of Language in Science," discusses the importance of disciplinary literacy in science education and lays the foundation for an understanding of how to provide discipline-specific literacy instruction. Chapter 2, "Developing and Activating Background Knowledge," provides ways to help students build

the needed background knowledge so that they can tackle an article about the quest to develop new antibiotics or listen to a podcast about cholesterol levels in children. We believe that reading in science often needs to rest on a certain amount of foundational stored information.

In addition to background knowledge, science readers need to have a solid store of technical and academic words, along with the skills to decipher or predict unknown, new terms. That's what Chapter 3, "Integrating Vocabulary Instruction Into the Science Classroom," is all about. Chapter 4, "Reading Science Texts," explores the ways in which readers in the discipline of science approach texts. This chapter includes strategies for comprehension, ways to guide and build science reading skills while simultaneously accessing content, and ideas for releasing the responsibility of learning to students. Chapter 5, "Writing in Science: Scaffolding Skills for Science Students," provides ways to get students started on science writing, including the use of writing frames, graphic organizers, writing-to-learn, and a writing protocol. Finally, Chapter 6, "Assessing Student Learning in Science," discusses the use of formative assessment, including how it can be used to both improve instruction and target specific needs of students. There is also a section in this chapter on creating purposeful assessments.

We are hopeful that this book will get you thinking about the various ways that students can learn from science texts so that they are better able to reflect on content, generate new ideas, and share content-based thoughts. While we bring in research-based theory and instructional ideas, we intend for this to be a jumping-off point for our reader educators. We provide a way to approach science literacy with a discipline-specific lens, but we intend for our readers to build on this so that individual science students, each unique in concerns and interests, in classrooms around the globe, can learn about, think about, and write about science that is relevant to them in their own corners of the world.