Book Review:

*Reading and Writing in Science: Tools to Develop Disciplinary Literacy (2nd Ed.)*

Disciplinary literacy instruction focuses on the unique ways knowledge is created in the disciplines, including the specialized ways experts in those disciplines read, write, and communicate (Rainey, 2016). This approach differs from content area literacy, which focuses on teaching general reading strategies to be used universally across subject areas (Mongillo, 2017). Disciplinary literacy has received substantial attention in recent years due to major policy documents such as the Common Core State Standards (CCSS) (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) and the Next Generation Science Standards (NGSS) (NGSS, Lead States, 2013), which call upon teachers to support students in developing advanced abilities to read, write, and communicate across the disciplines. Disciplinary literacy was even ranked as one of the top five hot literacy topics according to the International Literacy Association’s 2017 *What’s Hot in Literacy* report.

Since reading, writing, and listening are all essential to the work of professional scientists, it is critical that literacy practices be a central component of science instruction (Howes, Lim, & Campos, 2009). As promoted by the *Framework for K-12 Science Education* (National Research Council, 2012), disciplinary literacy instruction in science helps students acquire a deeper understanding of how knowledge is produced and how engineering solutions are developed, ultimately leading to more critical consumers of scientific information. In *Reading and Writing in Science: Tools to Develop Disciplinary Literacy (2nd Ed.)*, Maria Grant, Douglas Fisher, and Diane Lapp, all former classroom teachers and current educational researchers, answer the call for advanced literacy instruction in science. The authors present ideas for developing students’ reading, writing, listening, and speaking skills in science while also promoting critical thinking, inquiry, investigation, and problem solving abilities. Connections are made to the CCSS and
NGSS throughout the book. As a former classroom teacher, educational researcher, and teacher-educator, I encourage colleagues to read this book and put the ideas presented in practice.

The first chapter, “Teaching Students to Think Like Scientists,” illuminates global trends in science education in order to establish a need for improved science instruction. The international assessment data shows that several countries outperform U.S. students in science. Next, the authors explore the symbiotic relationship between the *Framework for K-12 Science Education* (National Research Council, 2012) and the CCSS (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). The authors provide an in-depth examination of the three dimensions of the NGSS, beginning with a look at the core disciplinary ideas, followed by a description of the science and engineering practices and crosscutting concepts. This close examination of the NGSS clearly illustrates the relationship between science and literacy.

The second chapter, “Knowing and Using Scientific Language to Communicate Like a Scientist,” considers the role of language, speaking, and listening in science. The authors stress that “science is an integral part of life, and knowing how to think about it, talk about it, and write about it is empowering” (Grant, Fisher, & Lapp, 2015, p. 16). This section provides several ideas for teaching specialized vocabulary in science and engaging students in meaningful science-related discussions, including semantic feature analysis and word play activities.

Next, the authors help shift our attention to the role of reading in science and explore the intersection between the CCSS Reading Anchor Standards and the NGSS. For example, the Science and Engineering Practices of the NGSS highlight the importance of collecting evidence in gathering information and reporting results. While evidence can obviously be gathered through hands-on lab activities, it can also be collected through the close reading of complex
science text. Similarly, the CCSS Reading Anchor Standards requires students to read closely, make inferences, and cite textual evidence to support conclusions drawn from the text. This exemplifies the strong relationship between the NGSS and CCSS. The authors also focus on text complexity as designated by the CCSS and describe several instructional routines, such as read-alouds, shared readings, wide reading, and close readings to engage students with text in science. Furthermore, reading about science can help students generate ideas and critically evaluate information about the scientific world.

In the fourth chapter, “Writing Like a Scientist,” the authors focus on the role of writing in science and illuminate connections between the CCSS writing anchor standards and the NGSS. As emphasized in the standards, the chapter focuses on the ways in which students can form arguments and provide evidence for their claims. Teachers will appreciate the variety of instructional routines described that extend far beyond formal laboratory write-ups to support students when writing in a science context.

In the final chapter, the authors conclude with the importance of using formative assessment data to guide science instruction for both individual students and the whole class. Assessment can range from informal assessments, such as listening in on students’ discussions, to more formal assessments like performance tasks and constructed responses. Also stressed is the importance of collaboration among colleagues. Teachers can analyze student assessment data together to better plan effective instruction that meets the wide array of students’ literacy and science needs.

Across all chapters, the authors pull from their own experiences to transport the reader into the classrooms of effective teachers by providing classroom scenarios that illuminate best practices for developing students’ scientific literacy skills. A common theme throughout the
book includes an emphasis on the synergy between the CCSS and NGSS. In every chapter, the authors highlight the intersection of reading, writing, listening, and speaking as foundations for creating and sharing teaching approaches rooted in science and engineering practices. Most importantly, the authors debunk the usual notion of “every teacher is a teacher of reading”.

Grant, Fisher, and Lapp (2015) recognize that science teachers are not reading teachers, but that effective science instruction extends far beyond just teaching content. Instead, they stress the importance of teaching the language of science by offering numerous opportunities for students to read, write, speak, and listen in order to facilitate scientific thinking.

Due to impressive growth in information based technology, students must develop advanced literacy skills, including the ability to read and comprehend complex texts, present valid arguments, support claims with substantial evidence, and conduct synthesis and comparative evaluation of information. Unfortunately, the lack of quality science instruction in U.S. classrooms threatens to leave us with a population of science-illiterate individuals. In order to help students develop scientific literacy, teachers must provide opportunities for students to read, write, and communicate in science classrooms. The world of science is alive all around us, and our students deserve to not only understand that world, but also to contribute to it.

As highlighted by the authors, “boring science classes that lack spark that we’ve all seen do harm to our society, to all of us” (Grant, Fisher, & Lapp, 2016, p. xi). We must work together to develop a generation of individuals who can engage in science-based conversations and tackle critical science and environmental issues. The type of instruction highlighted in this book helps students become scientifically literate and informed citizens who can think, read, write, and communicate about science-based issues and solutions. This book speaks to science teachers of all grades, literacy coaches, reading specialists, and anyone else who is devoted to successfully
supporting science literacy development. While there is still much to learn about disciplinary literacy in the context of science, this book offers a wealth of teaching approaches that engage students in purposeful science instruction and disciplinary literacy practices.
References


