

## Chapter 9

# Using Nonfiction Texts and Literature Circles to Rethink Science Learning

Paula A. Magee  
Indiana University, USA

Aimee Lee Govett  
East Tennessee State University, USA

Jane H. Leeth  
Indiana University-Purdue University Indianapolis, USA

### ABSTRACT

In school, science and literacy are often seen as separate entities. Science is frequently taught as fact-based, instruction-oriented, and free from biases and assumptions. Reading and writing, on the other hand, are often seen as personal, connected to cultural ideas and values, and more open to interpretation. In reality, neither are accurate, as both science and literacy are personal, connected to cultural values, as well as grounded in discipline structure and facts. One only has to look at critical issues, such as climate change, industrialization of food, and the mental health crisis to confirm that science is connected to people and their lives. Students, especially at the secondary and college level, are often taught, incorrectly, that science can be learned by following cookbook labs and memorizing facts. One powerful tool for teachers is strengthening the connections between science and literacy. Doing this supports students to challenge the ways they think about, learn, and do science.

### INTRODUCTION

In school, science and literacy are often seen as separate entities. Science is frequently taught as fact-based, instruction-oriented, and free from biases and assumptions. Reading and writing, on the other hand are often seen as personal, connected to cultural ideas and values and more open to interpretation. In reality, neither of these assumptions are accurate, as both science and literacy are personal, connected

DOI: 10.4018/978-1-5225-6364-8.ch009

to cultural values, as well as grounded in discipline structure and facts (National Research Council, 2012). One only has to look at critical issues, such as climate change, industrialization of food, and the mental health crisis, to confirm that science is connected to people and their lives. Students, especially at the secondary and college level, are often taught, incorrectly, that science can be learned by following cookbook labs and memorizing facts. As teachers of elementary, secondary and college students we realize the power of challenging conventional notions of how science is taught. One powerful tool for teachers is strengthening the connections between science and literacy. Doing so challenges students to explore the manner in which they think about, learn, and delve into scientific principles.

Understanding inquiry is at the heart of how we rethink science teaching and learning. Scientists in the real world excel at the inquiry process and we must foster this sense of discovery within our students, too. Successful scientists look at the world and wonder at almost everything they observe. They routinely ask themselves: How does this work? Why is this happening? What would happen if I did this and that? The interesting things about which scientists think do not occur in a vacuum. It is a complex process which requires communication, beginning with at least one and eventually extending to millions of people. Undoubtedly, scientists need knowledge and tools to answer these questions, and it makes sense to develop these questioning and problem solving capacities in our students.

First, scientific inquiry should be coupled with other academic standards. Academic standards should be integrated throughout unit design—starting by selecting concepts, based on the knowledge requirements, and then emphasizing comprehension and communication in a language and literacy rich environment. Inquiry-based endeavors require students to ask their own questions, investigate the responses that their observations support, and communicate those responses. This cyclical method of learning is exactly the methodology that academic and industrial scientists use, and implementing this type of organic inquiry in the K-12 curriculum is not only a necessary skill, but will also encourage student ownership of the subject matter (Wyner, 2013). Increasing rigor in the classroom, especially in the sciences, has been shown to increase the quality of students' scientific argumentation skills (Sampson, Grooms, & Walker, 2011), which is evidence of a general ability to think logically.

In this chapter, we share our work using nonfiction texts to engage students in developing the ability to complete scientific inquiry and in developing supported arguments for controversial and critical topics. Specifically, we will address the following questions:

1. How can teachers use nonfiction texts to teach science?
2. How can nonfiction texts help students appreciate and understand the complexity of science and its connection to people?
3. How can students better understand the inquiry process?
4. How can students learn to communicate their understanding of scientific processes and inquiry?

## **HOW DO WE DO IT?**

### **Choosing Books**

The first step is choosing books that will help students think about inquiry in deep and meaningful ways. An initial question might be: What is inquiry and why do students need to understand what it is? Then, we can determine how it plays a role in helping students understand the natural world. As

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