Language and Literacy in Inquiry-Based Science Classrooms, Grades 3-8

Zhihui Fang, Linda L. Lamme, Rose M. Pringle
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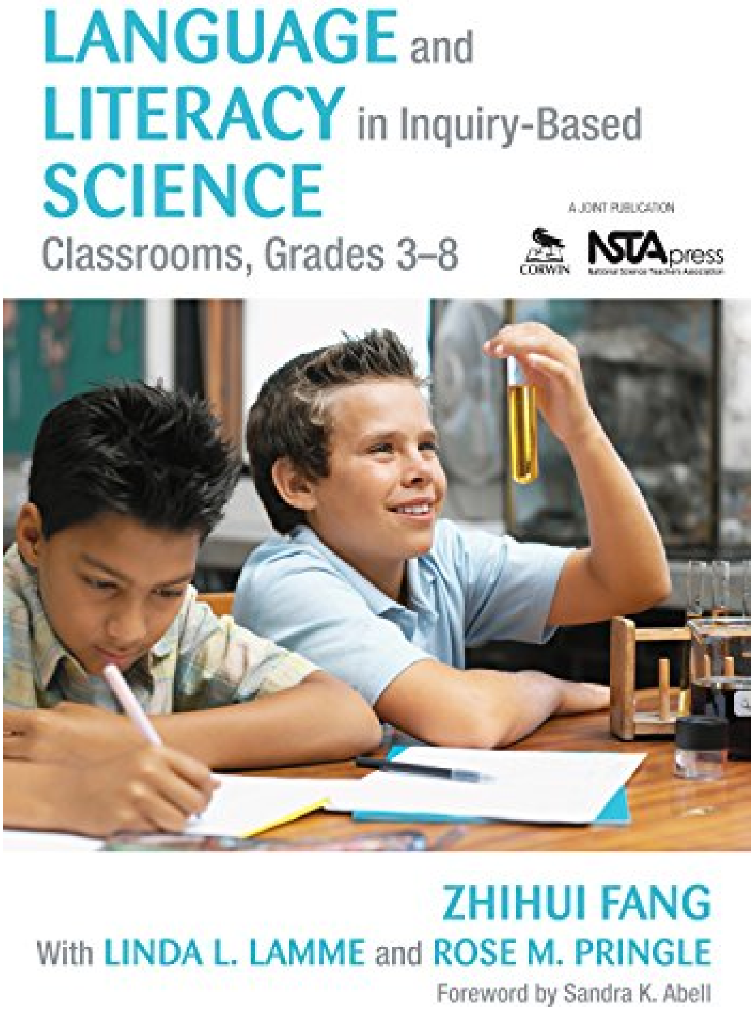

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Zhihui Fang, Linda L. Lamme, Rose M. Pringle : Language and Literacy in Inquiry-Based Science Classrooms, Grades 3-8 before purchasing it in order to gage whether or not it would be worth my time, and all praised Language and Literacy in Inquiry-Based Science Classrooms, Grades 3-8:

4 of 4 people found the following review helpful. Unrealistic portrayal of inquiry science.By Teacher MomWhile this book contains a lot of valuable information that will be helpful to teachers, the authors do not seem to understand the realities of classroom teaching. Budgets and time constraints would make some of the suggestions in this book impractical in most situations. In addition, the authors glossed over the unpredictable nature of inquiry-based science and the fact that students do not always ask the questions we expect them to ask or interpret results the way we

ourselves would interpret them.Analysis Fang, et al. make a good case for the importance of integrating literature into inquiry-based science, and there is no denying that many of the suggestions in this book would help students become better scientists as well as better writers and readers of science. Some of the activities described in this book were not new to me, but it is useful to find them all collected in one volume so that I can choose those that best fit my topic, teaching situation or students. A book like this also has the potential to combine diverse activities into a practical and unified framework for integrating science and literacy, in much the same way that ldquo;The Daily Fiverdquo; (Boushey Moser, 2006) created a framework to help teachers successfully manage literacy instruction. I feel that the authors fell short of creating a meaningful framework for science education that would work in real schools. In todayrsquo;s schools, teachers often feel the need to cover a great deal of content in a short period of time. As an example, the State of Alaska Department of Education prepared a list of science terms that students should know in order to be well prepared for the science SBA test. For the fourth grade, the list includes 176 terms. For the eighth grade level the list includes an additional 144 words (Wolter, 2011). Each of these words represent a concept, and many of the concepts are challenging for students to truly comprehend. The advantage of inquiry-based science instruction is that it can create the kind of deep understanding that we value for our students, understanding that goes far beyond a memorized definition. Fang, et al. cite research by Chang and Mao who ldquo;found that students who received inquiry-based instruction scored significantly higher on a knowledge-based earth science content test and developed more positive attitudes toward the subject than their peers who received traditional methods of science instructionrdquo; (p. 5). Unfortunately, inquiry-based science is time-consuming. Llewellyn (2002) concedes, ldquo;inquiry based learning takes more time. However, developing higher level thinking skills, having students pose questions, plan solutions, and gather and organize data are skills that must be nurtured over timerdquo; (p. 16). No Child Left Behind (NCLB) legislation has led to a greater emphasis on math and literacy education, and as a result less time is available for science instruction in schools. According to the National Center on Time and Learning (Strengthening Science Education, 2011), time spent on science has decreased an average of 33 percent from pre-NCLB levels. Fang, et al. do not seem to be aware of the time crunch that teachers face in using inquiry-based science instruction. They do not offer guidance on how to more efficiently teach inquiry science and in fact recommend activities that would require a great deal of class time be spent on topics that fall outside the realm of most science curricula. For example, they describe a game in which students use playing cards created by their teacher (presumably in her own spare time) to categorize science vocabulary words as pointers, describers, classifiers, heads and qualifiers (p. 66-68). While this kind of structural analysis of language might be helpful to some students, it would add to the already long list of vocabulary students need to master in science classes, while consuming time that students could spend on scientific inquiry. Time is not the only limiting factor in inquiry-based science classes. Teaching inquiry science also costs money. Engaging students in doing science requires supplies and equipment. Teachers are remarkably good at finding ways to use relatively inexpensive kitchen supplies, and many school districts have systems for purchasing and sharing equipment, but science is still an expensive subject to teach. Fang et al. suggest that teachers should also have on hand sets of science trade books at a variety of levels for each unit of inquiry. They point out that, ldquo;trade books provide good models of inquiry sciencerdquo; (p. 35) and that ldquo;there are many different trade books on the same topic that are written at different reading levelsrdquo; (p. 36) so that students with varying reading levels can be accommodated. I agree with these statements and appreciate the guidance that Fang et al. give on how to choose good science trade books. However, I think this discussion should also have included guidance on how to manage the expense of acquiring a large enough library of up-to-date science trade books for whole-class units of study like those they describe. While I feel that this book would have been stronger if it had been more realistic about the time and monetary constraints on inquiry-based instruction, I am even more dismayed at the unrealistic way in which it portrays the process of inquiry itself. The authors describe an ldquo;Inquiry-Based Science Lesson on Rocksrdquo; which, according to the text, took place in the classroom of a teacher named Mrs. Kaplan. In this lesson Mrs. Kaplan gave teams of four students a box of rocks and a hand lens and asked each time to divide the rocks into groups based on their characteristics, looking for clues to how the rocks might have formed. ldquo;After fifteen minutes, Mrs. Kaplan had each team share what they did with their rocks. Four of the six teams classified their rock collections into three groups. The other two teams reported that they had classified their rocks into four groups. Mrs. Kaplan conducted a whole-class discussion, asking the children what features they used to classify the rocks. As each feature was identified, she strategically wrote it on one of the three chart papers she had previously taped to the wall. She then distributed a set of six books to each of the four teams that had organized the rocks into three groups, instructing them to pick a book to read and find the answer to the question lsquo;What are the three types of rocks?rsquo; hellip;. Mrs. Kaplan then went to the other two teams and guided the children in making further observations of the rocks. Soon, a consensus was reached among the members of the two teams that their rocks should have been separated into three groups, at which time the teacher handed each team the same set of six books, and instructed them to read and respond to the same questionrdquo; (p. 10-11). The implication of this lesson is that students will somehow have classified their rocks into igneous, metamorphic and sedimentary groups. I think the chance of students coming up with these groups on their own is close to zero. My husband is a geologist. He can usually (but not always) quickly categorize a rock when he sees it. However, he is often using what he knows about individual rock types (i.e. I think that is basalt, basalt is igneous, therefore this is an igneous rock) to group the rocks. There are not obvious characteristics that would let students know that individual samples of rocks are of one type or another, even if they knew the categories already, which in this lesson they obviously do not. Students are much more likely to group rocks by color (not a reliable indicator because it can be changed as rocks are aged or altered, and because rocks in all three categories may contain the same minerals anyway), size or shape (which have very little to do with rock type) or texture (which could be useful, but not without more information about what to look for). It is hard for me to believe that this is a real lesson that took place with real students. It seems to me to be a lesson that someone (perhaps someone who has never tried to teach real students about rocks) dreamed up and imagined being carried out in a hypothetical classroom. Even if the lesson described above were real and would proceed as described, I do not think it is a good example of an inquiry lesson. When the teacher ldquo;guidesrdquo; her students to come to consensus that the rocks should really be in three categories, she is encouraging them to engage in the ldquo;guess-what-answer-the teacher-wants-to-hearrdquo; game that is often derided by proponents of inquiry. Since some teams obviously got the ldquo;rightrdquo; answer and got to begin their research on ldquo;What are the three types of rocks?rdquo; it is pretty obvious that the students in the remaining teams need to come up with three categories as well. Is this inquiry? Are students learning the process of science or are they being trained to distrust their own judgment and observations? Inquiry learning is a messy process. Very often studentsrsquo; observations donrsquo;t lead them to the answer we expect. Sometimes students, like the rest of us, see only what they expect to see. In the example above, couldnrsquo;t all students have been let loose on the books after making their observations, so that they could try on their own to reconcile their observations with the literature? It concerns me that in a book about inquiry-based science classrooms, in the chapter titled ldquo;Teaching Science as Inquiryrdquo; there is such an unrealistic and flawed lesson example. Other examples in the book seem similarly contrived and idealistic. I envision pre-service teachers reading this book and thinking that inquiry science teaching seems pretty simple and neat. When their own students arenrsquo;t able to easily ldquo;discoverrdquo; what they had hoped, they will wonder what they did wrong. They may throw up their hands and give up on inquiry science. When they canrsquo;t find the time or the resources to incorporate the strategies that Fang, et al. advocate for integrating literature, they may feel that they are not doing all that they should. I believe that such an unrealistic portrait does a disservice to teachers, to students and to inquiry-based science instruction.

This hands-on resource offers a wealth of strategies aligned with national science education standards, including sample lessons for integrating reading instruction into inquiry-based science classrooms.

"This is a much-needed addition to the science teacherrsquo;s library. Our studentsrsquo; inability to comprehend the written word in science text is the single biggest hindrance to their continuing in their studies, andnbsp;thus the primary reason we often lose them after elementary school." (Linda Keteyian, Science and Math Teacher 2010-05-03)"This book addresses an issue that is like an elephant in the room. Everyone knows that reading is an issue in science, butnbsp;ultimately no one is teaching students to read science." (Sally Koczan, Science Teacher 2010-05-03)"Finally, a book that not only provides sound research, but also offers practical, ready-to-use reading and vocabulary strategies to connect reading and science!" (Jenny Sue Flannagan, Director 2010-05-03)"Reading and writing can no longer be optional extras in the science classroom. This work shows how the demands of reading scientific texts differ from those of reading literary texts, clarifies the features of scientific text that must be learned so that it's readable, and describes the tools teachers need to teach reading in science." (Stephen P. Norris, Canada Research Chair in Scientific Literacy 2010-05-10)"This must-read book sets the standard for teaching reading comprehension with expository text!nbsp; I havenbsp;alreadynbsp;implemented some of the activities mentioned with great success." (Briana Nurse, Middle School Literacy Coach and Founder of Wellness Tutoring Services 2010-05-12)"This book embeds literacy tasks into science inquiry to enhance the functionality of instruction, support the construction of understanding, and develop a fundamental sense of science literacy. This results in fuller participation in the public debate about issues of science, technology, society and environment, which in turn leads to informed decisions and sustainable actions." (Larry D. Yore, Distinguished Professor 2010-06-24)"My first thoughts were, 'Irsquo;m not one of those teachers who teaches science by reading out of the book.' Sneaking the strategies in Language and Literacy in the Inquiry Based Science Classrooms, Grades 3-8 convinced me that students couldnbsp;learn science and improve their literacy skills without taking away from my curriculum. The methods and ideas in this book are useful, non-threatening and helpednbsp;me apply language practices that enhance science." (Sara Charbonnet, Science teacher, Department Chair 2010-08-25) "This is a much-needed addition to the science teacherrsquo;s library. Our studentsrsquo; inability to comprehend the written word in science text is the single biggest hindrance to their continuing in their studies, andnbsp;thus the primary reason we often lose them after elementary school." (Linda Keteyian, Science and Math Teacher 2010-05-03)"This book addresses an issue that is like an elephant in the room. Everyone knows that reading is an issue in science, butnbsp;ultimately no one is teaching students to read

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