Nonfiction Know-How

Surefire strategies for effectively using nonfiction trade books in your science classroom

By Valarie L. Akerson and Terrell A. Young

Children love nonfiction books, and their reading of such texts has shown a strong relationship between science achievement and informational reading and writing abilities (Bernhardt, Destino, Kamil, and Rodriguez-Munoz 1995). How can elementary teachers capitalize on this natural affinity and make the most effective use of nonfiction trade books in their classroom? There are numerous strategies to increase students' exposure to and facility with nonfiction. This article offers a few suggestions to help increase students' science learning and develop their literacy skills.

Think, Wonder, Learn

One recommended strategy for use with nonfiction books in a science classroom is the popular K-W-L (What I **K**now, What I **W**ant to Know, and What I **L**earned) organizational format (Ogle 1986) and its modifications. In this strategy, the teacher (or student) lists, on poster board in front of the class, what students already *know* about a science topic. In a second column, the teacher lists what the students *want* to know about a science topic. After the student reads the nonfiction selection, the student or teacher lists what the student *learned* about that topic from the reading selection.

One modification of the format—changing the "K" to a "T" (from what I *know* to what I *think* I know) and considering the "W" from "what I *want* to know" to mean "what I *wonder* about"—helps students build upon prior knowledge rather than seek specific science facts when reading the book.

In a T-W-L chart, the first column encourages students to share *all* their ideas about a concept, which can be helpful for teachers in identifying any misconceptions. It also relieves students from trying to give a "right" answer, as suggested by the "Know" column of the K-W-L form.

Teachers have also mentioned students having difficulty in identifying items for the "What I **W**ant to Know" column because students often say they don't

want to know anything about the topic. Changing the column to "What I **W**onder About" (the topic) is a less intimidating way of asking for the same kind of information, yet it alleviates the pressure of having to make students "want" to know about every subject. The final column remains the same because learning about the topic is what we are interested in as teachers.

Build a Scaffold

A second modification of the K-W-L format applies the premise in paragraph form to scaffold students' communication of what they have learned (Gambrell 2001). Figure 1 (page 50) shows the K-W-L paragraph frame used in this manner.

Teachers can model a K-W-L paragraph by filling in the frame as a class after a reading. In the first blank, students write the concept they are studying, such as electricity. In the second blank, students write what they "already knew" about the topic prior to the reading, such as "electricity travels in circuits." Then, students fill in the next two blanks with ideas they learned from their reading. Finally, they restate the concept they are studying in the next blank, and list one last idea they learned regarding the content.

We recommend modifying the paragraph form for science lessons by changing the phrase "I already knew____" to "I thought____." This change reinforces the idea that, when learning science, ideas are expected to change and that we often begin with initial ideas that are not scientifically accurate and build toward more accurate ideas.

Once students are comfortable with the format, they can create their own K-W-L paragraphs independently.

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A Classroom Library

Elementary students select nonfiction over fiction nearly half the time, provided they're given access to quality trade books of both types (Duke 2001); however, teachers don't often include nonfiction books in their classroom libraries (Duke 2000). By building a nonfiction library in your classroom, you will be creating a valuable resource that encourages both science and literacy learning. Below are suggestions for selecting appropriate texts for your classroom collection.

Bring in a variety of books and let students self-select what to read. The most important factor in determining a readable text is prior knowledge or interest about the topic (Moore 1998). Thus, it is acceptable to include informational texts at various reading levels in your collection and allow students to self-select books that provide them with the information they require about a certain science topic.

Select books with various perspectives on a science topic. Provide books that build on information from other books and complement one another in providing additional information (Fredericks 1998). By having a selection of different books, students will find more varied content information and viewpoints from different authors, allowing them to gain a fuller understanding of the topic.

Collect books from several science content areas. It is easy to find science trade books about the biological sciences and not so easy to find books on physical sciences, but try to include some from each field in your library. Important factors to consider are that the content be accessible, accurate, and interesting. This will assure that students gain appropriate understandings and are motivated to continue exploring the text.

Assess reading level prior to including a book in the library. While interest plays a big role in readability, reading level needs to be within reason. Also, check out the book's illustrations. Ask yourself, will the illustrations appeal to the students or will you have to "sell" the book to get students interested in it? The best book choices are those that interest students on their own.

Confirm the accuracy of the book's content. As a starting point, check the book's index to see if you recognize any loopholes in the science content. Then, read the book to review its content. If you're unsure if the content is accurate, pass the book to a knowledgeable colleague for a second review.

Book Talks

One of the most effective ways of promoting reading is through "book talks" (Allington 2001). In a book talk, a teacher briefly summarizes or reads a portion of a book aloud to get students excited about the story.

For example, *The Snake Scientist* (Montgomery 1999) is an ideal book for a book talk for intermediate grade students because the book shows how a person's passion for nature can lead to a career in science. In a book talk, the teacher might share some of this book's illustrations and introduce some information about the snakes and the scientist's line of research.

We recommend that teachers have five book talks per day, spending no more than two minutes per book. Of the five books, two should be nonfiction and at least one should have a science topic. In this way, students will be exposed to at least five science-related, nonfiction books per week. Moreover, having these books in the classroom library makes them much more accessible and thus likely to be read by students.

Modeling Nonfiction Strategies

Another effective way to help students learn appropriate nonfiction reading strategies is to model the process for students. To begin, choose a nonfiction science book and read it aloud. Look at the cover, read the title, and ask students to predict what the book is about.

Next, do the same thing for the table of contents, i.e., read the chapter titles and have students predict what they'll find in the book. Show students how to use the information on the table of contents, such as chapter titles and page numbers, to find specific information on a topic.

Then, show students how to use the index in the back of the book to access even more specific information. For example, using *Jacques-Yves Cousteau: His Story Under the Sea* (Bankston 2003), students can find information about Cousteau's specific inventions listed under "inventions" in the index. They can see how each invention is discussed on different pages of the book and note where to find information about each one.

Figure 1.

K-W-L paragraph frame.

I learned many things about _____. I already knew (thought) _____ but I learned _____. Something interesting I learned was _____. I also learned ____. The most important thing I learned about _____ was _____.

Lastly, model reading sections of the book that provide the desired information and teach students how to take notes from the reading. Again referring to *Jacques-Yves Cousteau: His Story Under the Sea*, the teacher could read about the invention of the SCUBA device aloud and ask students to identify when important information regarding the invention and its development—such as "the first test was a failure" and "SCUBA stands for self-contained underwater breathing apparatus"—is stated. Teachers could record these notes on an overhead, chart paper, or electronically. If students cannot note the most salient points of the passage, teachers can add important points to the notes and discuss with the students why they are important.

Many nonfiction books also include important charts, graphs, and picture captions that impart valuable content. Teachers can model appropriate use of these "informational extras," pointing out the importance of the figures and demonstrating for students how to interpret their information. For example, in Charles Micucci's *The Life and Times of the Apple* (1992), a teacher could focus on an illustration of the pollination of apple blossoms and discuss the information included in the picture captions such as, "As the bee gathers nectar, some of the pollen from other flowers accidentally brushes against this flower's stigmas." In addition, a teacher could discuss the labeling of drawings, such as the parts of the apple flower shown in the book.

Pairing Fiction and Nonfiction

One suggestion for ensuring that nonfiction gets incorporated into the elementary curriculum is to pair a nonfiction book with a fiction book when studying a certain science topic. Some professionally created curricula use this method (e.g., Steck-Vaughn Pair-It Books). These curricula come in different literacy levels, such as *emergent* and *fluency*, and include both science and social studies topics.

One example from this series is a pairing of bear books by Gare Thompson—*Bear Facts* (1997) and *The Bear Escape* (1997). These books were written for emergent readers. The nonfiction book, *Bear Facts*, provides information about bears in an easily accessible format for new readers. The fiction book, *The Bear Escape*, tells the story of a bear running all over the woods and finally just choosing to rest. The teacher could use these books to help young students learn to recognize the differences between nonfiction and fiction books. Students could look at the photographs or drawings in the books and discuss what information is (or looks to be) true and what is likely not true.

ABC and counting books can reinforce awareness of alphabet and number systems while delivering accurate science content in accessible ways.

Teachers can also pair fiction and nonfiction books on their own to match the science concepts they are teaching. For example, Seymour Simon's *Bones: Our Skeletal System* (1998) is a scientifically accurate nonfiction text about the human skeletal system illustrated with photographs of xrays. Pairing this text with *Funnybones* (Ahlberg 1980) would allow the students to compare the attributes of fiction with nonfiction as they enjoy the story of the "living" skeletons in Ahlberg's book.

ABCs for Content

ABC and counting books are another resource that can be used effectively in the elementary classroom. Not only do these books reinforce developing awareness of the alphabet and number systems, they also deliver accurate science content in accessible ways.

For example, *The Dinosaur Alphabet Book* (Pallotta 1991) features an illustration of a dinosaur and informational text about the dinosaur for each letter of the alphabet. The book introduces several theories as to why dinosaurs became extinct, providing teachers with an opportunity to discuss some ideas about the nature of science.

Another ABC book for upper elementary and middle school students, *Q Is for Quark: A Science Alphabet Book* (Schwartz 2001), presents insightful essays on 26 science topics, including atoms, cloning, and natural selection. Similarly, *The Butterfly Counting Book* (Pallotta 1998) delivers accurate science content in accessible ways. The book begins with *zero*, noting no butterflies live in Antarctica, but there are butterflies on each of the other six continents. The book also describes the differences between moths and butterflies and gives examples of 12 different kinds of butterflies and information about them while reinforcing counting skills from 1 to 20, as well as counting by twos using odd numbers.

As you can see from the numerous ideas presented in this article, there are many ways teachers can use nonfiction books effectively in the elementary classroom. We hope our suggestions will encourage you to take a second look at this often overlooked resource and begin incorporating nonfiction books into your science teaching. ■

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Resources

Ahlberg, J., and A. Ahlberg. 1980. *Funnybones*. New York: Scholastic.

Allington, R.L. 2001. *What Really Matters for Struggling Readers: Designing Research-Based Programs*. New York: Longman.

Bankston, J. 2003. *Jacques-Yves Cousteau: His Story Under the Sea*. Bear, Del.: Mitchell Lane.

Bernhardt, E., T. Destino, M. Kamil, and M. Rodriguez-Munoz. 1995. Assessing science knowledge in an English/Spanish bilingual elementary school. *Cognosos* 4: 4–8.

Duke, N.K. 2000. 3.6 minutes per day: The scarcity of informational texts in first grade. *Reading Research Quarterly* 3: 202–224.

Duke, N.K. 2001. *Using nonfiction to increase reading achievement and world knowledge*. Available at *www.teacher.scholastic.com/professional/literacypapers/duke.htm*.

Fredericks, A.D. 1998. Evaluating and using nonfiction literature in the science curriculum. In *Making Facts Come Alive: Choosing Quality Nonfiction Literature K–8*, R.A. Bamford and J. Kristo (Eds.), pp. 109–121. Norwood, Mass.: Christopher-Gordon.

Gambrell, L. 2001. *Comprehending nonfiction: Reading to learn*. Presentation at the International Reading Association Conference, New Orleans, La.

Micucci, C. 1992. *The Life and Times of the Apple*. New York: Scholastic.

Montgomery, S. 1999. *The Snake Scientist*. Boston: Houghton Mifflin.

Moore, P. 1998. Choosing quality nonfiction literature: Aspects of selection for emergent readers. In *Making Facts Come Alive: Choosing Quality Nonfiction Literature K–8*, R.A. Bamford and J. Kristo (Eds.), pp. 75–89. Norwood, Mass.: Christopher-Gordon.

National Research Council (NRC). 1996. *National Science Education Standards*. Washington, D.C.: National Academy Press.

Ogle, D.M. 1986. K-W-L: A teaching model that develops active reading of expository text. *The Reading Teacher 39:* 564–570.

Pallotta, J. 1991. *The Dinosaur Alphabet Book*. New York: Scholastic.

Pallotta, J. 1998. *The Butterfly Counting Book*. New York: Scholastic.

Schwartz, D.M. 2001. *Q is for Quark: A Science Alphabet Book*. Berkeley, Calif.: Tricycle Press.

Simon, S. 1998. *Bones: Our Skeletal System*. New York: Scholastic.

Thompson, G. 1997. *Bear Facts*. Austin, Tex.: Steck-Vaughn.

Thompson, G. 1997. *The Bear Escape*. Austin, Tex.: Steck-Vaughn.