# Using Narrative Informational Book Circles, Connection Charts, and Notebooks to Showcase Science as a Human Endeavor

*by Julie Jackson and Gayle Allen*

Making connections is an emerging education theme of the 21st century. Science teachers are encouraged to connect new learning with prior knowledge, learning with student interests and experience, and classroom activities with the history and nature of science. Strategies that facilitate these connections enrich and enhance instruction. Narrative informational book circles are the product of our efforts to combine current research in learning and cognition with integrated science and language-arts activities. They present instructional strategies that support students as they make connections, ask questions, and participate in discussions about science as a human endeavor.

## What is narrative informational literature?

Narrative informational literature includes high-quality nonfiction trade books that present scientific concepts, ideas, and biographies in a story format (Dreher and Voelker 2004) (see Figure 1 for examples and criteria for evaluating literature, and NSTA Recommends on page 98). Narrative informational biographies help students become familiar with scientists while illustrating how history and culture influence scientific endeavors (Tompkins 2003). They are effective instructional tools because they focus on content learning in context while impacting students' appreciation for science-based literature (Madrazo 1997). In fact, Carl Sagan stated that his "interest in science was maintained through all those school years by reading books and magazines on science fact and fiction" (Sagan 1996).

One approach to teaching science using narrative informational literature is to use literature circles. Book or literature circles have been used to teach reading. We advocate combining book circles and narrative informal biographies to teach science as a human endeavor. We use science biographies because they introduce students to the reality that "women and men of various social and ethnic backgrounds—and with diverse interests, talents, qualities, and motivations—engage in the activities of science" (NRC 1996). Historical accounts of scientists and scientific discoveries "help students understand scientific inquiry, the nature of scientific knowledge, and the interactions between science and society" (NRC 1996).

Choosing appropriate biographies can be a challenge. The Children's Book Council and selected NSTA experts review hundreds of books yearly. Their recommendations, published as the Outstanding Science Trade Books for Students K–12 list, can be found at *www.nsta.org/publications/ostb*. This is a good place to look for outstanding literature for your classroom science library.


## What are narrative informational book circles?

Narrative informational book circles provide a flexible structure that encourages students to engage in critical thinking and reflection as they read, discuss, and respond to carefully chosen nonfiction science trade books. Book circles are easy to start and can involve whole-class instruction (discussion) or groups of three to five students who are reading the same book (see the Straits article on page 32). Connection charts, story pyramids, and science notebooks are the tools we use to guide book circles. A connection chart (Figure 2) helps students focus discussions and organize ideas. Story pyramids (Figure 3) demonstrate comprehension of important story elements and science notebooks provide opportunities for personal reflection (see Resources). All three can be used as formative assessments.

## Introducing narrative informational book circles

At the beginning of the year, we introduce book circles as a whole-class activity in order to provide a model for students to follow when they are given the opportunity to work in small groups. Whole-group instruction is most effective when the teacher introduces the book, asks thought-provoking questions, and guides chart and pyramid construction. These prereading activities are followed by reading and discussion of the text. Typical discussion prompts include asking students to (1) predict what will happen next, (2) describe something that surprised them, (3) think about one question they would ask if they had an opportunity to meet the main character, (4) describe the events from a historical perspective, and (5) describe how they would react if they were the main character. Students are usually comfortable with the idea of discussing science texts after one whole-group activity and are anxious to be allowed to work cooperatively in small reading groups.

When book circles are organized into small groups of four to six students, the teacher acts as a facilitator, moving from group to group and using open-ended questions to stimulate discussion, encourage reflection, and guide chart construction:

- What do you know about this scientist?
- How did you acquire your knowledge?
- How could you find out more about this scientist?
- Why is this important to you?
- What science process skills are illustrated in the biography?
- What motivated the main character?
- Have you benefited from the work of this scientist?

In this small cooperative group setting, students discuss, react, and share responses. They are active learners,

**FIGURE 1** Narrative informational biographies and literature evaluation criteria

*Snowflake Bentley*, J. Martin (1998)
*Rare Treasure: Mary Anning and Her Remarkable Discoveries*, D. Brown (1999)
*She's Wearing a Dead Bird on Her Head*, K. Lasky (1995)
*The Librarian Who Measured the Earth*, K. Lasky (1994)
*Starry Messenger*, P. Sis (1996)
*John Muir: America's Naturalist*, T. Locker (2003)
*So You Want to Be an Inventor*, J. St. George and D. Small (2002)
*The Boy Who Drew Birds: A Story of John Audubon*, J. Davies (2004)
*Rachel Carson: Preserving a Sense of Wonder*, T. Locker and J. Bruchac (2004)
*Essential Scientists: The Journeys and Discoveries of 24 Men and Women of Science*, B. Shell (2005)
*To Space and Back*, S. Ride and S. Okie (1986)
*The Story of George Washington Carver*, E. Moore (1990)

**Checklist for evaluating narrative informational literature**

| | |
|---|---|
| Book title: | |
| Author: | |
| Reading level: | |
| Publisher: | |
| Date of publication: | |
| Is the science content recognizable? | Yes No |
| Is the story factual? | Yes No |
| Is fact discernible from fiction? | Yes No |
| How many misrepresentations does the book have? | 0 1 2 3 4 5+ |
| Are the illustrations correct? | Yes No |
| Are the illustrations/photographs visually appealing? | Yes No |
| Are characters portrayed with gender equity? | Yes No |
| Are characters portrayed with cultural sensitivity? | Yes No |
| Are animals portrayed naturally? | Yes No |
| Does the story promote a positive attitude toward science and technology? | Yes No |
| Will students find the book engaging? | Yes No |
| Recommended for classroom use | Yes No |
| Additional comments: | |

(Adapted from Mayer 1995 and Dreher and Voelker 2004)

refining and adding to their understanding of science as a human endeavor as they construct meaning with other readers. With practice, students can develop their own questions, guide their own discussions, and prepare charts independently (see Straits article on page 32).

Students enjoy participating in book circles and we include one book circle per grading period (six or nine weeks). Rounding up the books needed to begin and sustain book circles can be a challenge. We have purchased biographies with department funds and requested books through our school library. PTA/PTO fundraisers have supplied money for books and we have used a wish list for schools maintained by a local bookstore. Book circles usually meet for 20 minutes and they should be scheduled three to four times a week. Students need time to read and plenty of time for discussion, chart construction, and writing. Short books can be read during one book circle. Longer books need to be divided into sections and studied across several class periods. We recommend coordinating topics and themes with language-arts and history teachers. Book circles require active use of all language skills (reading, writing, listening, and speaking). Additionally, chronological thinking and using historical events to frame and analyze issues and decision making are important history standards (Nash, Crabtree, and National Standards for History Task Force 1996).

Book circles work well when students are assigned specific duties. Suggested duties include

- discussion director (keeps the discussion moving by asking questions and engaging all group members),
- timer (makes sure that everyone gets a chance to talk and keeps the activity within the allotted time),
- encourager (keeps the discussion positive),
- word finder (responsible for finding and making note of words that are new, different, strange, interesting, important, difficult, and so on),
- connector (looks for connections between the book and the outside world).

Book group members may read their assigned text out loud or silently. They also decide how many pages to read for each meeting and how many discussion questions each group member should write in their science notebook. When the books circles have finished reading and discussing their book, they share their new knowledge and understanding with their classmates in a making-meaning conference. This would be a great time to use content integration across subject areas. For example, teachers might coordinate science book circles with language-arts classes with writing and presentations. Students might create a readers' theater to dramatize what they have learned about the scientist or the concept and perform it for younger grades, complete with advertisements and television interviews. Then new groups form around new reading choices and the process repeats itself. Students are graded on their participation and products. Short absences are managed by reviewing missed reading sections before beginning new reading assignments. Students are given an opportunity to borrow a book from the class library if they have extended absences.

## Using charts and science notebooks

Charts provide a snapshot view of the learning that is taking place in a classroom. They provide a visual framework for organizing information and are routinely used to introduce new topics, activate prior knowledge, solicit questions, develop vocabulary, and generate interest. The connection chart (Figure 2) is a synthesis of promising practices suggested in reading, language-arts, and science education research. It contains elements of the KWL chart (Ogle 1986), reading elaborative processes (Fountas and Pinnell 2001), and current learning research (NRC 2000). A connection chart can be drawn on a piece of butcher paper and hung on a wall for whole-class instruction. Small groups may work together to create one chart or students may prepare individual connection charts that remain in their science notebooks.

The connection chart is designed to help students activate prior knowledge and monitor the acquisition of new knowledge while making real-world connections. At the beginning of a book circle, students make prior knowledge explicit by listing what they believe or already know. Students also list the sources of their prior knowledge. Where or how did they learn what they believe? This step demonstrates the importance of media (internet, television, print, movies) as an information source, while providing students with an opportunity to recognize how their learning has developed over time. Finally, they formulate questions. What are they wondering about? These questions are used to drive book-circle discussions. Book-circle concluding activities include listing what students have learned from the reading and group discussions. This allows students to monitor their own learning and compare what they have learned to what they initially believed to be true. They take responsibility for and direct future learning by listing ways that they can continue to learn. Finally, they connect their new knowledge with the real world. Making personal connections helps students understand that science is a human endeavor that affects their lives on a daily basis.

A story pyramid (Figure 3) is a graphic organizer that visually represents the main elements of a story. We use story pyramids to portray important biographical and historical details. After reading the biography, students work in groups to complete the story pyramid. Completed story pyramids are used to guide discussions and summarize information. Charts and story pyramids can be stored in pocket folders.

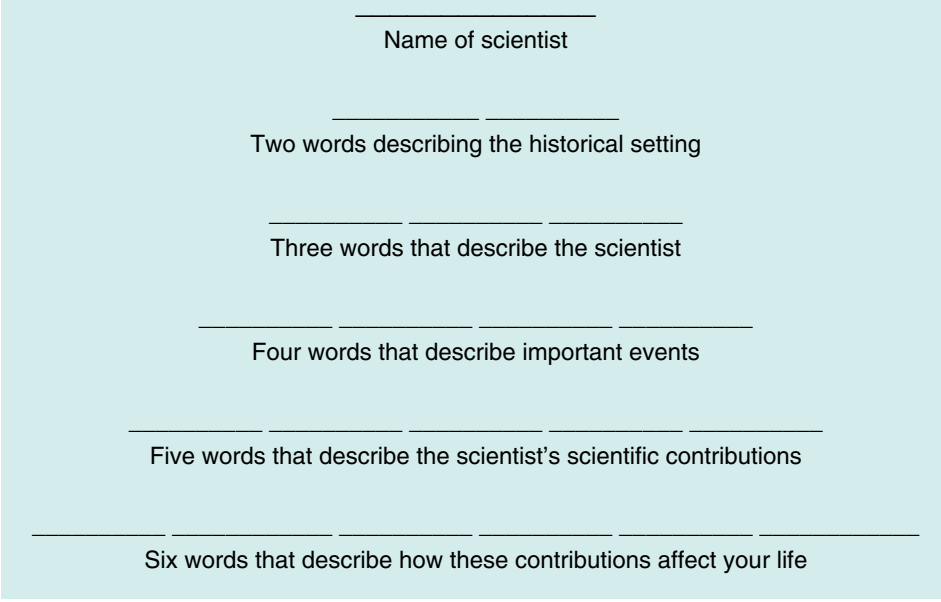
Science notebooks guide group discussions. Notebook entries might include new vocabulary, questions or com-

**FIGURE 2** Connection chart

| Connections | | | |
|---|---|---|---|
| To self | What do you believe?<br>Activate prior knowledge | What do you wonder?<br>Ask questions | What have you learned?<br>Monitor learning |
| To media | What was the source of your information?<br>Recognize how understanding has developed over time | | How can you find out more?<br>Direct future learning |
| To world | How is this connected to your world?<br>Promote real-world (contextual) understanding | | |

(Adapted from Ogle 1986, Fountas and Pinnell 2001, and NRC 2000)

**FIGURE 3** Story pyramid




ments students would like to discuss, or ideas that puzzle them. Students can also use notebooks to draw pictures and graphic organizers that summarize important biographical details. We encourage a daily review of selected notebooks to ensure that students take notes and make faithful entries.

## Conclusion

The tasks of using research-based practices, getting more science into a crowded curriculum, and making important connections are easily accomplished when language-arts and science instruction are integrated. Narrative informational book circles provide students opportunities to interact with science content and history through literature. Connection charts and story pyramids guide book-circle activities and showcase science as a human endeavor. ■

## Connecting to the Standards

This article relates to the following National Science Education Standards (NRC 1996):

History and Nature of Science: Content Standard G

- All students should develop understanding of science as a human endeavor.

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### Resources

Story pyramid—*http://edsitement.neh.gov/lesson_images/lesson364/Story_Pyramid.pdf*

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