Connections Charts and BOOK TALK GROUPS

Support science instruction with these useful strategies

By Julie Jackson, Gayle Allen, and Gail Dickinson

Making connections is always an important task for teachers. Science teachers are encouraged to connect new learning with students' prior knowledge, learning with student interests, learning with cultural experiences, and classroom activities across academic disciplines. Strategies that facilitate these connections help teachers enrich and enhance instruction. We've found two strategies—connections charts and book talk groups—to be excellent ways to guide teachers in using trade books and other narrative informational literature to support student learning in science. (See sidebar, "What Is Narrative Informational Literature?," p. 28, and Figure 1, p. 29, for more information on these topics.) After introducing the two methods, we describe our experiences with implementing the methods in a fifth-grade classroom.

The Connections Chart

A picture is worth a thousand words, and a connections chart provides a picture—a visual framework—to organize the learning that is taking place in a classroom. The connections chart (Figure 2, p. 30) is a synthesis of promising practices suggested in language arts, reading, 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). The connections chart is routinely used to introduce new topics, activate prior knowledge, solicit questions, develop vocabulary, and generate interest in a selected topic.

Connections charts may be used at any point in a science unit. The science content of the selected literature determines the placement of this activity within a unit. Connections charts may be used at the beginning of a unit to introduce a topic, in the middle of a unit to reinforce instruction, or at the conclusion of instruction to assess understanding. Students are typically presented with an overview of the entire chart. Discussions usually include a review of the terminology included on the chart and the importance of completing each section.

A connections chart can be drawn on a large 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 connections charts that remain in their science notebooks. The connections 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 science lesson or unit, students make prior knowledge explicit by listing what they believe or already know about the topic and the sources of their prior knowledge on the chart.

We live in an information-rich, technology-infused world and students need to learn how to evaluate the information they encounter. Having students stop to consider the question *Where or how did they learn what they know or believe to be true?* helps students recognize the importance and power of media (Internet, TV, print, movies) as an information source and how their learning has been influenced and developed over time.

Next, students formulate questions about the topic. *What about the topic are they wondering?* These questions are used to drive later book talk groups and classroom discussions. To complete the connections chart, students list what they 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. Students take

What Is Narrative Informational Literature?

Information books play an important role in science instruction because they support content learning in context while impacting students' appreciation for science-based literature (Madrazo 1997). In fact, Carl Sagan (1996) stated that his "interest in science was maintained through all those school years by reading books and magazines on science fact and fiction." Books that provide accurate science content embedded in an engaging story vicariously expose students to science facts, introduce new concepts, and expand vocabulary. Stories that include problems that need solutions use science-process skills to inform character decisions. Making observations, collecting data, and asking questions are common themes found in stories that maximize science learning.

Narrative informational biographies connect science content with the history of science and the contributions of scientists. They help students become familiar with scientists while illustrating how history and culture influence scientific endeavors (Tompkins 2003). Science biographies 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, p. 170).

Choosing Narrative Informational Literature

Teachers are urged to be cautious when selecting narrative informational literature for use in their classrooms. All science content should be accurate, recognizable, and reflect state and national science education standards. Checklists for choosing narrative informational literature for teaching science have been developed and field-tested (Mayer 1995; Dreher and Voelker 2004).

Figure 1 (p. 29) contains a summary of questions teachers should ask when choosing science-based narrative informational literature. Teachers can also consult the annual Outstanding Science Trade Books for Students K–12 list *(www.nsta.org/publications/ostb)* for nonfiction trade book suggestions. The Children's Book Council and selected NSTA experts review hundreds of books every year. Reviewers look for books that are scientifically accurate and engaging. This list is a good place to look for outstanding literature for your classroom science library. We have also compiled a list, available online, of narrative informational trade books that meet these criteria (see NSTA Connection).

responsibility for and direct future learning by listing ways that they can access additional information. Finally, students connect their new knowledge with the real world by completing the *How is this connected to my world?* section of the chart. Making personal connections helps students connect science content to the world they know (Yager 2004).

Book Talk Groups

Book talk groups provide a flexible structure that encourages students to engage in critical thinking and reflection as they read, listen, and discuss carefully chosen nonfiction science trade books. Book talk groups are easy to start and can involve whole-class instruction (discussion) or groups of three to five students who are reading the same book. The number of books available determines the size of the groups. Connections charts provide a place to record questions, focus book group discussions, organize ideas, and provide opportunities for personal reflection. Before dividing students into book talk groups, we suggest reviewing the connections chart with the whole class. Teachers using the chart with their students for the first time should explain that the connection "to self" means a connection to "me" and that "media" includes textbooks, the internet, movies, TV, newspapers, magazines, and libraries.

Once the students are divided into small groups, they are given a set amount of time to complete the story and the connections charts. Each student has the same job: question generator. While reading the story, each student should write questions in the "What do you wonder about" section of the chart. They should each develop at least three questions about the book or science concepts related to the story that they would like to discuss. Usually the best discussion questions come from their own thoughts, connections, feelings, and concerns experienced while reading. Teachers may also use the question prompts listed below to jumpstart student thinking:

- What was going through your mind while you read this?
- How did you feel while reading this part of the book?
- What questions did you have when you finished this section?
- Did anything in this section of the book surprise you? Why?
- Did you encounter any new vocabulary? What was it?

A Classroom Example

The following example highlights the experience of a fifth-grade teacher who implemented a three-day book talk group lesson using *Stone Wall Secrets* by Kristine and Robert Thorson (1998). *Stone Wall Secrets* is a compelling story about a real-world problem that the reader and the main characters, Adam and his grandfather, need to solve. The narrative describes how the rocks in an old farm fence were formed, weathered, eroded, and transported and explains how the everyday landscape provides clues to the past.

To begin, before students are assembled into their book groups, the class reviewed a blank connections

Figure 1.

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 children find the book engaging?
Yes No
Recommended for classroom use
Yes No

Additional Comments:

*Adapted from Mayer 1995, Dreher and Voelker 2004

chart to clarify terminology. Students decided to add some phrases to clarify each connection, such as adding "What does it have to do with me?" under the "a connection to self"; "how you learn" underneath "connection to media" to jog the appropriate meaning; and "why we care" underneath the "connection to world" to help guide students in what to write there.

Then the students were divided into small groups. They were given two class periods to complete reading *Stone Wall Secrets*, generate and discuss their questions, and complete their individual connections chart. Some groups completed the story in the first day, and others took as long as all of day two. The groups varied in the time it took to read the story because some groups stopped and discussed the book as they read and others read all the way through and discussed the story after they finished reading it. Upon completion of the book and group discussions, the students were asked to complete a group connections chart. On the third day of the project, the whole class reconvened

Figure 2.

Connections chart.

Connections			
To Self "me"	**What do I believe?**	**What do I wonder?**	**What have I learned?**
To Media	**Source of information—Where did I learn it?**	**How can I find out more?**	
To World	**How is this connected to my world?—Why do I care?**		

and discussed individual and group connections charts and then their ideas were consolidated into a class connections chart that was constructed using an overhead transparency.

Before reading *Stone Wall Secrets*, these students were asked if they felt that rocks were interesting. The general consensus was that rocks were not very interesting. After completion of the book talk groups and taking time to make personal connections, however, many students began showing a greater interest in Earth science, bringing to class on their own accord rocks that they found significant. Because of the high interest, students were allowed to discuss their rocks with the class, and the class observed the rocks one by one. Eventually, students collected enough rocks to create a miniature stone wall in their classroom. Finally, students wrote essays about their individual rocks. *How were they formed? What natural events influenced the shape, color, and size of the rock?* This activity unraveled the secrets of the classroom stone wall just as the *Stone Wall Secrets* characters explored the interesting rocks they encountered in the story.

Teachers who have used connections charts report that they help students organize useful information together in one place and that it is a great teaching tool because it provides a format that the students can use to track their thinking, record questions, and personal meanings. Connections chart entries have also been used to prompt and support classroom discussions.

Making Connections

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 literature and book talk groups provide students with opportunities to ask questions while they interact with science content and process skills through literature. Connections charts help students recognize how understanding is developed over time and provide opportunities to connect science content to the real world by providing a framework for students to discover for themselves how the topic relates to them and why they care about it. ■

Julie Jackson **(jj32@txstate.edu)** ***is an assistant professor of science education at Texas State University in San Marcos, Texas. Gayle Allen*** **(ggallen@mail.utexas.edu)** ***is a lecturer in language and literacy studies at the University of Texas in Austin, Texas. Gail Dickinson*** **(dickinson@txstate.edu)** ***is an assistant professor of science education at Texas State University in San Marcos, Texas.***

Connecting to the Standards

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

Teaching Standards

Standard A:

Teachers of science plan an inquiry-based science program for their students.

National Research Council (NRC). 1996. *National science education standards*. Washington, DC: National Academy Press.

Acknowledgement

Melissa Revere, a fifth-grade teacher in Liberty Hill, Texas, field-tested the original connections chart. Her insightful comments and suggestions guided the revision process.

NSTA Connection

Find a list of narrative informational trade books compiled by the authors at *www.nsta.org/sc0811.*

References

Dreher, M.J., and A.N. Voelker. 2004. *Crossing borders in literacy and science instruction, choosing informational books for primary-grade classrooms: The importance of balance and quality.* Arlington, VA: NSTA Press.

Fountas, I.C., and G.S. Pinnell. 2001. *Guiding readers and writers, grades 3–6*. Portsmouth, NH: Heinemann.

Madrazo Jr., G.M. 1997. Using trade books to teach and learn science. *Science and Children* 34(6): 20–21.

Mayer, D.A. 1995. How can we best use children's literature in teaching science concepts? *Science and Children* 32(6): 16–19, 43.

National Research Council (NRC). 1996. *National science education standards*. Washington, DC: National Academy Press.

National Research Council (NRC). 2000. *How people learn*. Washington, DC: 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.

Sagan, C. 1996. *The demon-haunted world: Science as a candle in the dark*. New York: Ballantine Books.

Thorson, K., and R. Thorson. 1998. *Stone wall secrets*. Gardiner, ME: Tilbury House.

Tompkins, G.E. 2003. *Literacy for the 21st Century: teaching reading and writing in pre-kindergarten through grade 4*. Upper Saddle River, NJ: Merrill Prentice Hall.

Yager, R. 2004. Choosing Informational Books for Primary-Grade Classrooms: The importance of Balance and Quality. In *Crossing Borders in Literacy and Science Instruction*, ed. E.W. Saul, p. 95–107. Arlington, VA: NSTA Press.