

Perfect Pairs: Teaching Science through Literature

by Melissa Stewart

Some students love reading fiction. Others would much rather delve into a richly-illustrated, fact-filled nonfiction title. Because different children enjoy different kinds of books and learn in different ways, pairing fiction and nonfiction titles is a great way to introduce and reinforce science concepts. And when you follow up the reading with discussion questions and fun, inquiry-based activities, students are even more likely to remember the experience—and the content.

I began pairing the science books I've written with popular children's fiction titles in 2006. From time to time, teachers contacted me to say how much they appreciated my suggestions. But the positive feedback really started to roll in when I began giving presentations about Perfect Pairs at conferences for teachers and librarians. And it increased exponentially when I jumped into the social media arena by setting up a Twitter account (@mstewartscience) last year.

Perfect Pairs highlight curriculum connections between award-winning science-themed trade books and a wide variety of fiction titles. Sometimes even I'm surprised by the results. For example, it turns out that middle grade novels like *Project Mulberry* by Linda Sue Park and *Ninjas, Piranhas, and Galileo* by Greg Leitich Smith really bring the experimental process and the scientific method to life for tweens. And elementary students learn to appreciate rocks in a whole new way by reading stories like *Everybody Needs a Rock* by Byrd Baylor and *Rocks in His Head* by Carol Otis Hurst.

Sneaking in Science

But there's another great reason that now is the perfect time for Perfect Pairs and other programs that link science and language arts. In recent years, many schools have scaled back on science education. Like it or not, teachers must devote more time to reading and math in an effort to improve student scores on No Child Left Behind-mandated assessment tests. As a result, many elementary students are receiving limited science instruction, and many middle school students are sorely lacking in basic science knowledge and skills.

What's the solution to this problem? Teaching science through literature. Coupling inquiry-based science and language arts instruction can help you prepare students for the critical reading and open response portions of assessment tests without neglecting science education.

And here's more good news. No matter what grade(s) you teach, there are plenty of accurate, well-crafted nonfiction and fiction titles that can work together to enhance the topics in your curriculum.

To get you started, I've provided some examples below. In each case, the fiction title is listed first. Complete citations for each book are included in the bibliography at the end of this article.

After you've read through the titles, take a look at the three boxes containing book summaries and sample discussion questions and activities. They'll give you a sense of how you can use Perfect Pairs in your classroom. The six featured books are all about amphibians, but they can also be used to enrich lessons that focus on life cycles, habitats and ecosystems, food chains and food webs,

predators and prey, animal adaptations, the interrelationships among living things, as well as the importance of respecting and caring for wildlife and wild places. I hope these examples inspire you to start searching for more great children's books that you can pair together to enhance both your science and language arts lessons.

Birds

Birds by Kevin Henkes + *Birds: Nature's Magnificent Flying Machines* by Caroline Arnold (Grades 2-4)

Owl Moon by Jane Yolen + *Vulture View* by April Pulley Sayre (Grades 1-4)

The Year the Swallows Came Early by Kathryn Fitzmaurice + *The Man Who Flies with Birds* by Carole G. Vogel and Yossi Leshem (Grades 4-7)

Butterflies

The Very Hungry Caterpillar by Eric Carle + *Waiting for Wings* by Lois Ehlert (PreK-1)

Butterfly House by Eve Bunting + *Where Butterflies Grow* by Joanne Ryder (Gr K-3)

Hurry and the Monarch by Antoine O. Flatharta + *Monarch and Milkweed* by Helen Frost (Gr K-3)

Rocks and Minerals

Everybody Needs a Rock by Byrd Baylor + *If You Find a Rock* by Peggy Christian (Gr 1-4)

The Pebble in My Pocket by Merredith Hooper + *Let's Go Rock Collecting* by Roma Gans (Gr 2-5)

Rocks in His Head by Carol Otis Hurst +

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Extreme Rocks & Minerals by Melissa Stewart (Gr 2-5)

Scientific Method

Ninjas, Piranhas, and Galileo by Greg Leitich Smith + *Lucy Long Ago: Uncovering the Mystery of Where We Came From* by Catherine Thimmesh (Gr 4-8)

Project Mulberry by Linda Sue Park +

The Bug Scientists by Donna Jackson (Gr 4-8)

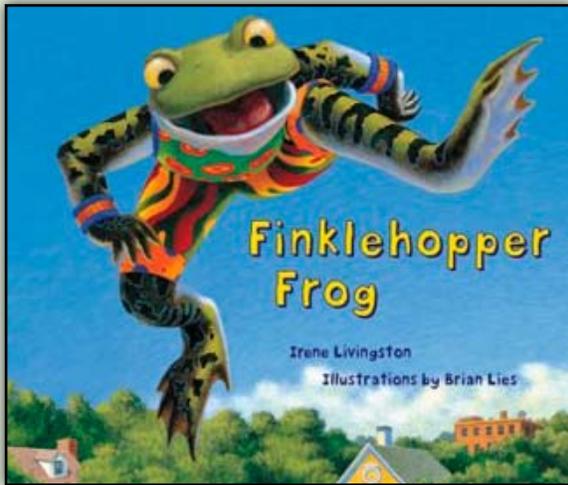
Flush by Carl Hiasen + *Tracking Trash: Flotsam, Jetsam, and the Science of Ocean Motion* by Loree Griffin Burns (Gr 5-8)

Weather

The Rain Came Down by David Shannon + *When Rain Falls* by Melissa Stewart (Gr K-2)

One Windy Wednesday by Phyllis Root + *I Face the Wind* by Vicki Cobb (Gr 1-3)

Snow by Uri Shulevitz + *Snowflake Bentley* by Jacqueline Briggs Martin (Gr 1-4)



Finklehopper Frog by Irene Livingston + *Frogs to Tadpoles* by Wendy Pfeffer (Gr K-2)

Finklehopper Frog wants to join the crowd, but he doesn't dress like the other animals, and he looks a bit silly when he tries to move like them. Finklehopper feels sad until a friend helps him realize that sometimes we've all just got to bop to the beat of our own drummer. Rhyming text and brightly-colored comical art make *Finklehopper Frog* a fun read aloud.

Frogs to Tadpoles introduces readers to the life cycle of frogs, with additional facts about individual species on the last two pages. Sentences are simple, with questions and exclamations to help break up the informative text. Carefully-rendered watercolor illustrations show a variety of pond animals and plant life through the seasons.

CLASS DISCUSSION

Ask students what the books have in common. [They are both feature frogs. They are both illustrated with paintings.]

How are the books different? [One book is fiction. A child-like frog character learns a lesson and grows emotionally. The other book is nonfiction. It focuses on the frog life cycle—how the leggy leapers grow and develop physically.]

Review the four steps of the frog life cycle.

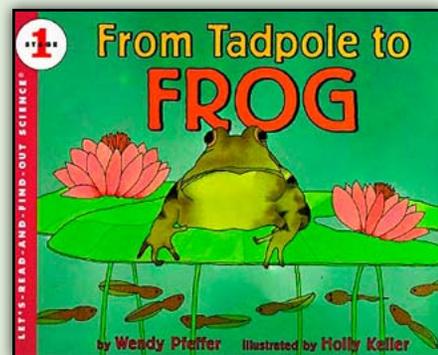
CLASS ACTIVITIES

Materials: White paper, pencils, crayons

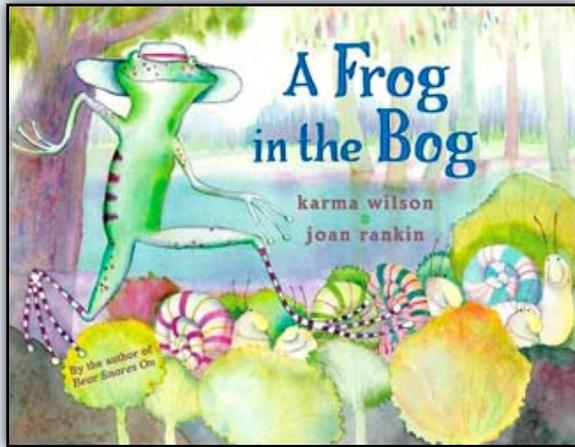
Children love to learn by doing, so try this kinesthetic activity. Have your students count off by fours. All number ones should go to the front of the classroom. Ask them to pretend they are frog eggs. Number twos should stand on the right-hand side of the room. They will pretend to be tadpoles. Threes should go to the back of the room and act like froglets, and fours should stand on the left-hand side of the room and pretend to be adult frogs. After a few minutes, reassign roles so that eggs become tadpoles, tadpoles become froglets, etc. When all four groups have enacted each life stage, ask students to draw a frog life cycle.

Materials: Lined paper, pencils

Have students pretend they are frogs. Ask them to write a detailed description of how it feels to go through each life stage.



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***A Frog in the Bog* by Karma Wilson + *Frog in a Bog* by John Himmelman (Gr K-3)**

A Frog in the Bog is quirky counting book about a frog that eats everything in sight. The story screeches to a halt when the log our hero is resting on suddenly develops menacing yellow eyes and a huge set of jaws. As the frog screams “GATOR,” all the critters in his bulging belly escape. Luckily, the gator isn’t interested in a scrawny, little frog and swims away. Soft, dreamy watercolors include hilarious details that perfectly compliment the bouncy, rhythmic tale.

Frog in a Bog pairs clear, simple text and delicate yet energetic ink-and-watercolor art to provide a basic understanding of creatures living in a bog habitat. The text leads readers through a series of events and encounters that circles back to the frog who starts off the story.

CLASS DISCUSSION

Ask students what the books have in common. [They are both about frogs and the creatures that share their habitat.]

How are the books different? [One is a silly story with realistic, but fictional characters. The other presents a chain of events that shows how creatures in a wetland really interact.]

Discuss what makes one book fiction and the other nonfiction.

CLASS ACTIVITIES

Materials: CD of frog calls, CD player

As a class, listen to and practice the calls made by frogs living in your area. Encourage students to listen for these calls on spring evenings.

Materials: Notebooks, pencils

On a sunny day, take your students out to the playground and encourage them to start a nature journal. Have them look for insects, spiders, and other small creatures. Each student should observe a living thing, draw a picture of it, and describe its features and make notes about its activities. Students can also look for insect eggs and seeds. Do they see things they never noticed before? Do they see anything that really surprises them?

Materials: Lined paper, pencils

Have students create a silly story about one or more of the creatures they observed on the school playground.

Additional Resources

Camp, Deanne. “*It Takes Two: Teaching with Twin Texts of Fact and Fiction.*” *The Reading Teacher*, February 2000, pp. 400-408

Taberski, Sharon. “*Fact & Fiction: Read Aloud.*” *Scholastic Teachers*. Internet page at: <http://www2.scholastic.com/browse/article.jsp?id=3344>. Date viewed: December 16, 2009.

Bibliography

***Birds.** Kevin Henkes. (Illus. by Laura Dronzek) Greenwillow, 2009. 32pp.

Birds: Nature’s Magnificent Flying Machines. Caroline Arnold. (Illus. by Patricia J. Wynne) Charlesbridge, 2003. 32pp.

The Bug Scientists. Donna Jackson. Houghton Mifflin, 2004. 48 pp.

***Butterfly House.** Eve Bunting. (Illus. by Greg Shed) Scholastic, 1999. 32pp.

***Everybody Needs a Rock.** Byrd Baylor. (Illus. by Peter Parnall) Aladdin, 2007. 32pp.

***Finklehopper Frog.** Irene Livingston. (Illus. by Brian Lies) Tricycle Press, 2008. 32pp.

***Flush.** Carl Hiassen. Knopf, 2005. 272 pp.

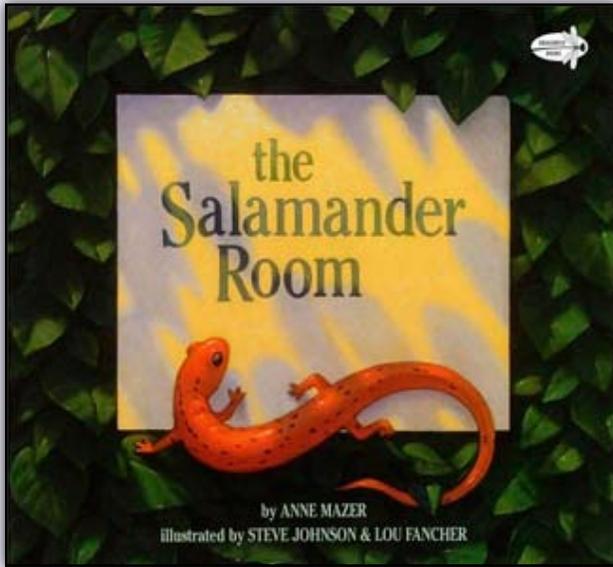
Frog in a Bog. John Himmelman. Charlesbridge, 2004. 32pp.

***A Frog in the Bog.** Karma Wilson. (Illus. by Joan Rankin) Margaret K. McElderry Books/Simon & Schuster, 2003. 32pp.

Frogs to Tadpoles. Wendy Pfeffer. (Illus. by Holly Keller) HarperCollins, 1994. 32pp.

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***The Salamander Room* by Anne Mazer + *A Place for Frogs* by Melissa Stewart (Gr 2-5)**

The Salamander Room is a gentle tale with an important message. A boy finds a salamander in the woods and asks his mom if he can keep it. Instead of saying “no,” she asks the boy questions that require him to think about what the salamander needs to survive and, ultimately, to realize that he cannot create an adequate home for the salamander in his bedroom. Lush, shadowy paintings perfectly capture the mood of the boy’s increasingly elaborate plans for transforming his room into a suitable habitat for the little amphibian.

Clearly written and richly illustrated, *A Place for Frogs* provides a gentle introduction to the environmental hazards frogs face and promotes environmental stewardship by providing concrete examples of how scientists and citizens are working together to protect frogs and their habitats. Pointers on how youngsters can help frogs in their area are included.

CLASS DISCUSSION

Ask students what the books have in common. [They are about protecting amphibians and their habitats.]

How are the books different? [One is a story with people as characters. The other provides information about how our actions can help and harm frogs.]

Discuss what amphibians and other creatures need to survive in their habitat.

CLASS ACTIVITIES

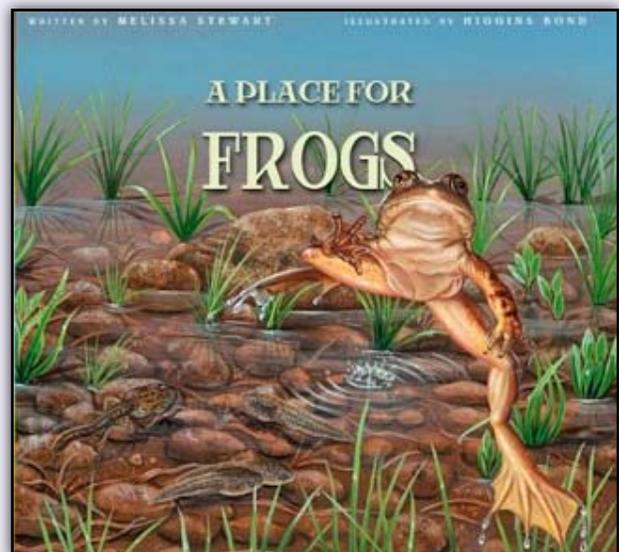
Materials: Lined paper, pencils

As a class, create a list of things people do to harm the frogs. Ask students how people could change their behaviors to help frogs. Divide the class into small groups. Ask each group to write down some things they do every day that could harm the environment or the animals that share our world. [Possibilities include wasting electricity; wasting water; forgetting to recycle; littering; using straws, Styrofoam cups, and heavily packaged foods such as drink boxes; throwing out old clothes, games, toys, bicycles instead of donating them to charities.] Then have students list ways they could modify their behavior. A spokesperson from each group should share the group’s ideas with the rest of the class.

A frog’s tongue is about one-third the length of its body. If our tongues were that long, we could use them to clean out our belly buttons! Using the data listed below, have your students calculate the length of the each frog’s tongue.

- Pine barrens tree frog: 1 inch
- Wood frog: 2 inches
- Green frog: 3 inches
- Northern leopard frog: 4 inches
- Western toad: 5 inches
- Bullfrog: 7 inches

Most frogs can jump about twenty times their body length. Using the data listed above, have your students calculate how far each species can jump.



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***Hurry and the Monarch. Antoine O. Flatharta.** (Illus. by Meilo So) Knopf, 2005. 32pp.

I Face the Wind. Vicki Cobb. (Illus. by Julia Gorton.) HarperCollins, 2003. 40pp.

If You Find a Rock. Peggy Christian. (Photos by Barbara Hirsch Lember) Harcourt, 2000. 32pp.

The Man Who Flies with Birds. Carole G. Vogel and Yossi Leshem. Kar-Ben, 2009. 64 pp.

Monarch and Milkweed. Helen Frost. (Illus. by Leonid Gore) Simon & Schuster, 2008. 32pp.

Let's Go Rock Collecting. Roma Gans. (Illus. by Holly Keller) HarperCollins, 2007 32pp.

Lucy Long Ago: Uncovering the Mystery of Where We Came From. Catherine Thimmesh. Houghton Mifflin, 2009. 64pp.

***Ninjas, Piranhas, and Galileo. Greg Leitich Smith.** Little, Brown, 2003. 192pp.

***One Windy Wednesday. Phyllis Root.** (Illus. by Helen Craig) Candlewick, 1996. 32pp.

***Owl Moon. Jane Yolen.** (Illus. by John Schoenherr) Philomel, 1987. 32pp.

***The Pebble in My Pocket. Meredith Hooper.** (Illus. by Chris Coady) Viking, 1996. 32pp.

A Place for Frogs. Melissa Stewart. (Illus. by Higgins Bond) Peachtree, 2010. 32pp.

***Project Mulberry. Linda Sue Park.** Clarion, 2005. 240pp.

***The Rain Came Down. David Shannon.** Blue Sky Press, 2000. 32pp.

Rocks in His Head. Carol Otis Hurst. (Illus. by James Stevenson) Greenwillow, 2000. 32pp.

***The Salamander Room. Anne Mazer.** (Illus. Steve Johnson and Lou Fancher) Dragonfly Books/Knopf, 1994. 32pp.

***Snow. Uri Shulevitz.** Farrar, Straus & Giroux, 1999. 32pp.

Snowflake Bentley. Jacqueline Briggs Martin. (Illus. by Mary Azarian) Houghton Mifflin, 1998. 32pp.

Tracking Trash: Flotsam, Jetsam, and the Science of Ocean Motion. Loree Griffin Burns. Houghton Mifflin, 2007. 64 pp.

***The Very Hungry Caterpillar. Eric Carle.** Philomel, 1969. 32pp.

Vulture View. April Pulley Sayre. (Illus. by Steve Jenkins) Holt, 2008. 32pp.

Waiting for Wings. Lois Ehlert. Harcourt, 2001. 32pp.

When Rain Falls. Melissa Stewart. (Illus. by Constance R. Bergum) Peachtree, 2008. 32pp.

Where Butterflies Grow. Joanne Ryder. (Illus. by Lynn Cherry) Dutton, 1989. 32pp.

***The Year the Swallows Came Early. Kathryn Fitzmaurice.** HarperCollins, 2009. 288pp.

**Denotes fiction titles.*

Melissa Stewart is the award-winning author of more than 100 science books for children. She frequently speaks and writes about ways to teach science through literature. Please visit Melissa on the Web at www.melissa-stewart.com.