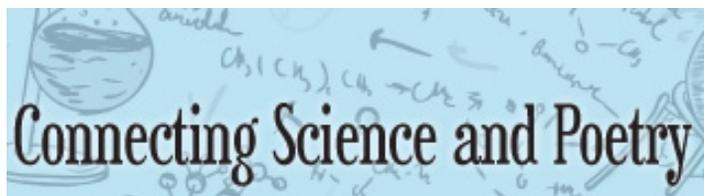


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In a recent National Public Radio feature, “Physics and Poetry: Can You Handle the Truth?,” writer Adam Frank admitted, “Poems and poetry are, for me, a deep form of knowing, just like science. Yes, obviously, they are different. But each, in its way, is a way to understand the world.” Although it may seem surprising, poets and scientists both seek to observe, explain, and understand the world around them. In her title *Practical Poetry: A Nonstandard Approach to Meeting Content-Area Standards*, Sara Holbrook reminds us, “In ancient Greece, there was no distinction between a scientist, poet, or philosopher.” Linking language arts and science offers opportunities to develop both comprehension skill and content knowledge, and poetry is the perfect vehicle for capitalizing on those teachable moments of overlap and connection.

Poetry’s brevity, conceptual focus, and rich vocabulary make it a natural teaching tool for connecting with science. Several additional advantages come with using poetry across the science curriculum:

- Poetry is accessible to a wide range of reading abilities.
- The brief format of much poetry taps the essence of a subject.
- Poetry can provide sensory experiences, giving children the senses of touching, tasting, smelling, hearing, and seeing.
- Poetry can make a topic memorable through the use of highly charged words and vivid images.
- Poetry can help children talk about issues that concern them.

Poetry often involves a high level of abstraction in language and ideas, and it requires specific critical thinking skills and deeper comprehension. Infusing poetry across the curriculum can serve to jump-start or introduce a topic, present examples of terminology or concepts, provide closure that is concept-rich, or extend a topic further. Plus, there are many thematic poetry collections devoted to science-related subjects, such as animals, weather, seasons, space, dinosaurs, and geography. Look for the Newbery Honor Book *Dark Emperor and Other Poems of the Night* or *Ubiquitous: Celebrating Nature’s Survivors*, both by Joyce Sidman, or Marilyn Singer’s titles *A Strange Place to Call Home: The World’s Most Dangerous*

Habitats and the Animals That Call Them Home and *A Full Moon Is Rising*, for just a few recent examples.

All kinds of books have a great deal of potential for supporting science learning. A brief consideration of recently published poetry books will quickly reveal many poems that connect with the sciences and several poets who regularly create poetry books with science-rich content; in addition to Sidman and Singer, consider Jane Yolen, Carole Gerber, Leslie Bulion, J. Patrick Lewis, and Douglas Florian, among others.

Getting Started with Science Poetry

One way to begin incorporating science-themed poetry is to inject poems into activities that are already a part of your schedule. If you share Mother Goose rhymes with young children, try *The Green Mother Goose: Saving the World One Rhyme at a Time*, by Jan Peck and David Davis. Or start a storytime with a seasonal poem from Sid Farrar’s *The Year Comes Round: Haiku through the Seasons* or a selection from Lee Bennett Hopkins’ *Sharing the Seasons*.

If you want to invite students to read aloud, look for Carole Gerber’s *Seeds, Bees, Butterflies, and More! Poems for Two Voices*, which features poetry for two voices. If you regularly provide support for science units, try connecting thematic poetry collections with popular curricular topics. Look for *Water Sings Blue: Ocean Poems*, by Kate Coombs, or *At the Sea Floor Café: Odd Ocean Critter Poems*, by Leslie Bulion, to supplement an oceans unit. Or, for a study of insects, try J. Patrick Lewis’ *Face Bug: Poems; Nasty Bugs*, edited by Lee Bennett Hopkins; and *Bug Off! Creepy, Crawly Poems*, by Jane Yolen. No matter what we are already doing to promote science learning, poetry can help supplement, support, and enrich it.

In her work *Give Them Poetry: A Guide for Sharing Poetry with Children K–8*, Glenna Davis Sloan issues “a word of caution in the matter of ‘using’ poetry in the service of other areas of study.” Sloan says, “Poetry should be allowed to develop literacy on its own.” That’s a good reminder. There are many possibilities for linking poetry with subject matter, but do not forget to stop and enjoy the poems for their own sake, too.

The more connections we can provide between what children are learning in various areas of study, the deeper their learning will be. If poetry can be a vehicle for connecting books, skills, concepts, and information across the curriculum, we owe it to children to integrate poetry wherever we can. We can encourage children to think like a poet *and* a scientist in observing the world and how things work, using all of their senses, and gathering “big words” as they read, write, and learn. As Albert Einstein reminds us, “Logic will get you from A to B. Imagination will take you everywhere.”

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At the Sea Floor Cafe: Odd Ocean Critter Poems. By Leslie Bulion. Illus. by Leslie Evans. 2011. 45p. Peachtree, \$14.95 (9781561455652). 811. Gr. 3–6.

Bodies from the Ice: Melting Glaciers and the Recovery of the Past. By James M. Deem. 2008. 64p. illus. Houghton, \$17 (9780618800452). 599.9. Gr. 4–7.

Bug Off! Creepy, Crawly Poems. By Jane Yolen. Illus. by Jason Stemple. 2012. 32p. Boyds Mills/Wordsong, \$16.95 (9781590788622). 811. K–Gr. 3.

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The Elephant Scientist. By Caitlin O’Connell and Donna M. Jackson. Illus. by Caitlin O’Connell and Timothy Rodwell. 2011. 80p. Houghton, \$17.99 (9780547053448); e-book, \$17.99 (9780547574011). 599.67. Gr. 6–9.

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A Full Moon Is Rising. By Marilyn Singer. Illus. by Julia Cairns. 2011. 48p. Lee & Low, \$19.95 (9781600603648). 811. Gr. 2–4.

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Nasty Bugs. Ed. by Lee Bennett Hopkins. Illus. by Will Terry. 2012. 32p. Dial, \$17.99 (9780803737167). 811. Gr. 1–3.

The National Geographic Book of Animal Poetry. By J. Patrick Lewis. 2012. 192p. illus. National Geographic, \$24.95 (9781426310096); lib. ed., \$28.90 (9781426310546). 808.81. PreS–Gr. 3.

Once Upon a Tiger: New Beginnings for Endangered Animals. By Janet Wong. Illus. by Sladjana Vasic. 2011. 40p. OnceUponaTiger.com, e-book, \$3.99 (9781937057022).

Once Upon Ice and Other Frozen Poems. By Jane Yolen. Illus. by Jason Stemple. 1997. 40p. Boyds Mills, paper, \$9.95 (9781590781746). 811. Gr. 4–6.

Out of This World: Poems and Facts about Space. By Amy E. Sklansky. Illus. by Stacey Schuett. 2012. 40p. Knopf, \$17.99 (9780375864599). 811. Gr. 3–5.

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The Tree of Life: Charles Darwin. By Peter Sís. Illus. by the author. 2003. 44p. Farrar/Frances Foster, \$19.99 (9780374456283). 576.8. Gr. 4–7.

The Tree That Time Built: A Celebration of Nature, Science, and Imagination. Ed. by Mary Ann Hoberman and Linda Winston. 2009. 222p. illus. Sourcebooks/Jabberwocky, \$19.99 (9781402225178). 811. Gr. 3–7.

Ubiquitous: Celebrating Nature's Survivors. By Joyce Sidman. Illus. by Beckie Prange. 2010. 40p. Houghton, \$17 (9780618717194); e-book, \$17 (9780547772738). 811. Gr. 2–5.

Vhersed: A Celebration of Outstanding Women. By J. Patrick Lewis. Illus. by Mark Summers. 2005. 32p. Creative Company, \$18.95 (9781568461854). 811. Gr. 4–7.

Water Sings Blue: Ocean Poems. By Kate Coombs. Illus. by Meilo So. 2012. 32p. Chronicle, \$16.99 (9780811872843); e-book, \$12.99 (9781452119564). 811. Gr. 1–4.

What's for Dinner? Quirky, Squirmy Poems from the Animal World. By Katherine B. Hauth. Illus. by David Clark. 2011. 48p. Charlesbridge, \$16.95 (9781570914713); paper, \$7.95 (9781570914720). 591.5. Gr. 2–5.

The Year Comes Round: Haiku through the Seasons. By Sid Farrar. Illus. by Ilse Plume. 2012. 32p. Albert Whitman, \$16.99 (9780807581292). 811. PreS–Gr. 3.

Sylvia M. Vardell is a professor of children's and young adult literature at Texas Woman's University and the author of the *Poetry for Children* blog.

Professional Poetry Resources

There are many key professional resources that support using poetry in

science. *Using Poetry across the Curriculum: Learning to Love Language*, by Barbara Chatton, provides comprehensive lists of several hundred poetry books and poems organized around topics emphasized in the national science standards, including inquiry; scientific tools; physical sciences, life sciences, and earth and space sciences; technology; personal and social perspectives; and the history and nature of science. Poet Sara Holbrook offers doable strategies for infusing poetry across the curriculum in her book *Practical Poetry: A Nonstandard Approach to Meeting Content-Area Standards Using Poetry across the Curriculum*. And in my own book, *The Poetry Teacher's Book of Lists*, you'll find bibliographies and strategies for selecting and sharing poetry across the curriculum, including lists of poetry books gathered around the topics of seasons, Earth Day, animals, birds, cats, dinosaurs, dogs, food, gardens, insects, mathematics, general science, space, time, trees, and weather. Below are helpful professional resources that offer insight on the new science standards as well as teaching strategies.

Design, Make, Play: Growing the Next Generation of STEM Innovators. By Margaret Honey and others. 2013. 256p. Routledge, \$135 (9780415539166); paper, \$29.95 (9780415539203).

A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Ed. by the Committee on Conceptual Framework for the New K–12 Science Education Standards National Research Council. 2012. 385p. illus. National Academies, paper, \$39.95 (9780309217422).

From STEM to STEAM: Using Brain-Compatible Strategies to Integrate the Arts. By Thomas J. Pilecki and David A. Sousa. 2013. 280p. illus. Corwin, paper, \$34.95 (9781452258331).

Give Them Poetry: A Guide for Sharing Poetry with Children K–8. By Glenna Davis Sloan. 2003. 120p. illus. Teachers College, paper, \$17.95 (9780807743676).

Poetry Friday Anthology for Science. By Sylvia M. Vardell and Janet Wong. March 2014. Pomelo, paper, \$29.99 (9781937057978).

The Poetry Teacher's Book of Lists. By Sylvia Vardell. 2012. 314p. illus. Pomelo, paper, \$17.99 (9781475100747).

Practical Poetry: A Nonstandard Approach to Meeting Content-Area Standards Using Poetry across the Curriculum. By Sara Holbrook. 2010. 192p. illus. Heinemann, \$30 (9780325007670).

STEM Lesson Essentials, Grades 3–8: Integrating Science, Technology, Engineering, and Mathematics. By Jo Anne Vasquez and others. 2013. 192p. illus. Heinemann, paper, \$26.25 (9780325043586).

Using Poetry across the Curriculum: Learning to Love Language. By Barbara Chatton. Rev. ed., 2010. 241p. illus. Libraries Unlimited, paper, \$40 (9781591586975).

Scientific Steps

by Cynthia Cotten

Find a problem, ask a question.
That's the way you start.
Now, do research, all you can.
That's the second part.
Predict an answer—a hypothesis—
Based on what you know.
Run a test—an experiment.
Finished? How'd it go?
Repeat that step a few more times,
Are your results the same?
Analyze your data—
Does it back up your claim?
Write up your observations.
Be clear, avoid confusion,
Then share with others what you've found.
This is your conclusion.

This poem appears in *The Poetry Friday Anthology for Science* and is used with permission here. For more information about the book and access to a downloadable preview, go to the Pomelo Books website (pomelobooks.com), and for more about the poet Cynthia Cotten, visit her website, at cynthiacotten.com.

Common Core Connections: Science-Themed Poetry

The following are suggestions for incorporating science-themed poetry into the curriculum while implementing the Common Core State standards. You can find more information about the standards at www.corestandards.org.

In the Classroom: Pairing science-themed nonfiction or informational books and poetry may seem to be an unlikely partnership at first, but these two different genres can complement one another by showing children how writers approach the same topic in very different and distinctive ways. In addition, children will see that they can learn a lot of information from both a poem and a work of nonfiction. Poetry has an advantage over informational prose in that it typically consists of many fewer words. Poems can be read and reread in very little time, and each rereading can be approached in a slightly different way, for example, through choral reading or poetry performance. Look for poetry anthologies organized by subject matter, when possible, since they help make the content connection obvious.

Here are some suggested pairings of nonfiction books and poetry collections on related science topics:

- Steve Jenkins' *Actual Size* with Valerie Worth's collections *Animal Poems* and *Pug and other Animal Poems*
- Peter Sis' *The Tree of Life: Charles Darwin* with Mary Ann Hoberman and Linda Winston's poetry anthology *The Tree That Time Built: A Celebration of Nature, Science, and Imagination*
- Sy Montgomery's *The Tarantula Scientist* with Jill Corcoran's poetry collection, *Dare to Dream . . . Change the World*
- Tanya Lee Stone's *Almost Astronauts: 13 Women Who Dared to Dream* with J. Patrick Lewis' biographical poetry book *Vhorses: A Celebration of Outstanding Women*
- Pair Caitlin O'Connell and Donna M. Jackson's *The Elephant Scientist* with Tracie Vaughn Zimmer's *Cousins of Clouds: Elephant Poems*
- Brian Floca's *Moonshot: The Flight of Apollo 11* with Amy E. Sklansky's *Out of This World: Poems and Facts about Space*
- Pair James M. Deem's *Bodies from the Ice: Melting Glaciers and the Recovery of the Past* with Jane Yolen's *Once Upon Ice and Other Frozen Poems*

With each pairing of titles above, have students examine how information is presented in prose or poetry. Read excerpts or selections aloud and identify the key details shared in each passage. Consider how the book's illustrations (whether as paintings, prints, or photographs) offer details alongside the poetry. Make a Venn diagram showing what facts are gleaned from the poetry and from the informational titles, and what concepts overlap in both sources.

Common Core Connections

- **CCSS.ELA-Literacy.RI.4.3.** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- **CCSS.ELA-Literacy.RI.4.9.** Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.
- **CCSS.ELA-Literacy.RL.5.7.** Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, multimedia presentation of fiction, folktale, myth, poem).

In the Classroom: In his anthology *The National Geographic Book of Animal Poetry*, J. Patrick Lewis provides an introduction to many different animals in more than 200 poems—all illustrated with stunning full-color photographs. One second-grade teacher used the book prior to an annual research project on animals to push children to go beyond the familiar cats and dogs they usually choose as their research subjects. She read widely from the poems and showed the illustrations, introducing animals including the tortoise, flamingo, and yak. Then students browsed through the book and brainstormed a list of possible animals to study. After students had chosen their subjects (in pairs or small groups), the teacher guided the class to read informational picture books about their subjects, looking for three key facts about their chosen animals. The teacher ended with reading aloud more animal poems to see which factual details were repeated in the poetry. You can follow this teacher's example with additional poetry books about animals, such as Amy Gibson's *Around the World on Eighty Legs: Animals Poems*, Katherine B. Hauth's *What's for Dinner? Quirky, Squirmy Poems from the Animal World*, or Janet Wong's *Once upon a Tiger: New Beginnings for Endangered Animals*.

Common Core Connections

- **CCSS.ELA-Literacy.RI.2.6.** Identify the main purpose of a text, including what the author wants to answer, explain, or describe.
- **CCSS.ELA-Literacy.RI.2.7.** Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
- **CCSS.ELA-Literacy.RI.3.1.** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

Common Core Connections: Science-Themed Poetry

In the Classroom: Children can also work together to create a collaborative “found” poem from a science source. Use a descriptive paragraph from an informational book, a news article, or an encyclopedia entry as your factual source. Have students underline or highlight what they think are the most important words in the informational passage. Which words are essential to describing the subject? Ask the students to copy the words in a vertical list, and a poem begins to emerge. Then have students decide which words are essential and which arrangement is both clear and most poetic. Finally, post the poem alongside the original source and talk about these two different ways of sharing information. Georgia Heard offers examples of “found” poems in her book *The Arrow Finds Its Mark: A Book of Found Poems*.

Common Core Connections

- **CCSS.ELA-Literacy.RL.3.4.** Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.
- **CCSS.ELA-Literacy.RL.4.5.** Explain major differences between poems, drama, and prose, and refer to the structural elements of poems (e.g., verse, rhythm, meter) and drama (e.g., casts of characters, settings, descriptions, dialogue, stage directions) when writing or speaking about a text.
- **CCSS.ELA-Literacy.RI.5.1.** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

In the Classroom: For a more visual approach, students can work in pairs or small groups to do research on a specific subject in a unit of study, seeking out relevant poems and creating a visual product to share their findings and impressions. This can take many forms, both physical and digital, but a favorite is the old-fashioned mural. For example, the topic of space is a popular one in science study and lends itself to an expansive project. Gather a set of space-related poetry books, like Amy E. Sklansky's *Out of This World: Poems and Facts about Space* and Douglas Florian's *Comets, Stars, the Moon, and Mars*, and invite students to choose a favorite poem and topic. They can copy the poem, research the topic further with print or online resources, and then create a collaborative drawing or tissue-paper collage to represent their topic—posting both their art and selected poem on a door or wall covered in black craft paper. Many more ideas can be found at online teaching resources such as the “For educators” link at the NASA website (www.nasa.gov) and the U.S. Department of Energy's site (www.energy.gov).

Common Core Connections

- **CCSS.ELA-Literacy.RL.3.5.** Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza; describe how each successive part builds on earlier sections.
- **CCSS.ELA-Literacy.RI.4.7.** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- **CCSS.ELA-Literacy.RI.5.3.** Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.