Over many years, we have inquired into the integration of science and literacy in primary grades. Our students have used science notebooks as places to write and draw their scientific questions, predictions, observations, research notes, claims, reflections, and wonderings. At the same time, we have engaged our students in writers' workshop. They are accustomed to writing processes such as drafting, revising, editing, publishing, and genre study. Recently, we became interested in having students infuse their scientific knowledge and understandings into their writing. In this article, we describe how we led first graders through explorations of poetry and understanding the world of rocks and earth materials and then merged these lines of study through the writing of poetry about rocks and earth materials (Figure 1).
Exploring the World of Poetry

Our poetry study was guided by the work of Georgia Heard and her book *Awakening of the Heart*. Heard describes the need to fill our classrooms with poetry throughout the year, not just at the end of the school year when everything else is done. She emphasizes the unique nature of poetry, a genre that enables students to consider their own and other’s feelings more than any other form of writing. In her words, “[Poetry] can also help our students open their eyes to the beauty of the earth, restore a belief in the power of language, and help them begin to understand the truths inside them” (Heard 1999, p. xviii).

We began by immersing students in poetry. We filled the room with books of poetry and used poems as read-alouds and within small-group guided reading lessons. Students noticed poetic language in a range of texts and read many different poems. We helped them find poems they understood and loved, analyze more challenging ones, and perform their favorites.

As poetry filled the air, we began to pay attention to characteristics of poems and the crafting strategies of authors. We collectively investigated, “What do we notice about poems?” While there are many elements to consider, we focused on those that seemed the most developmentally appropriate for primary-age students. These included painting a picture with your words, repetition, comparisons, and line breaks. For each of these strategies, we noted and collected examples.

To transition from studying to writing poems, we invited students to bring to school items that were meaningful to them. They wrote about these objects, combining their observations, feelings, wonderings, and memories. We guided students to circle the parts of their writing that sounded poetic. They moved on to use these identified poetic seeds as the beginnings of poems that were drafted. Students read and reread their work; revised in a range of ways—adding line breaks, repeating words or phrases, and turning ordinary words into poetic ones; and published their poems to share with classmates and families.
Understanding Rocks and Earth Materials

While students were working on poetry in writers’ workshop, they were simultaneously investigating rocks and Earth materials in science. We began by reading aloud and discussing Byrd Baylor’s *Everybody Needs a Rock* (1974). We spent time as a class responding to the book and discussing her recommendations for choosing a perfect pet rock. Following our discussion, we led the class outside to explore and choose pet rocks, guided by a list of outdoor safety tips (see NSTA Connection). Students returned to the classroom to design and create paper “rock houses.” These houses were taped to student tables and the rocks remained there for the duration of the unit. This allowed each student access to a special rock that would be used throughout their investigation.

We continued to engage students by reading other texts including Peggy Christian’s *If You Find a Rock* (2008) and by having students write in their science notebooks. Prompts included, “What have you observed about rocks in the past?” and “What are you wondering about rocks?” The students met in groups to discuss their writing and each group shared a few thoughts with the whole class in a scientist meeting.

We moved on to systematically investigate the properties of rocks, connecting to the *Next Generation Science Standards* about conducting investigations to describe different kinds of materials by their observable properties (See Connecting to the NGSS, p. 43). Students began exploring rocks by focusing on their pet rocks.

Using magnifying glasses and containers of water for dipping rocks, students observed their rocks, noticed special features, and wrote and drew their observations in their science notebooks. We read a variety of informational texts and through them we began to identify properties of rocks such as size, color, texture, and hardness. The students returned to their pet rocks and began to “name” the properties that they observed. They also explored and sorted other rock sets to identify properties in a wider assortment of rocks. We used a variety of tools including magnets, scratch plates, and magnifying glasses to assist in our investigations. In a scientist meeting, students identified similarities, differences, and patterns.

Our next step was to explore the many uses of rocks. We discussed ways in which we had seen rocks used in our world, connecting to the crosscutting concept about the Influence of Engineering, Technology, and Science on Society. We took a walk inside and outside of our school to find as many items as we could that were made out of rocks.

Students participated in a poetry slam to cap off the unit.
Poetry Rocks!

Students recorded their observations in their science notebooks and were amazed at the number of objects made out of rocks. We followed this investigative walk with discussions of our findings and integrated secondary research to identify the many uses of Earth materials in our world.

The final stage of our explorations was focused on the study of soil. We guided our students with three main questions: “Is soil a type of rock?” “How is soil different?” and “What is in soil?” Students made and discussed predictions. Then we asked them how we could find answers to these questions. They responded that we could “go look at the dirt.” We put students into cooperative teams and gave them each a bowl and a spoon for scooping soil. We went outside and asked students to collect samples from different areas in the school yard and then, to reinforce good safety practices, made sure they washed their hands after handling the soil. Once the samples were collected, students were given magnifying glasses, toothpicks, and plates in order to separate the different materials in their samples. They sorted the samples and recorded all of their observations in their science notebooks. This information was shared during our scientist meeting and whole-class data was collected on a chart, analyzed, and interpreted. Our next natural step in the process was to integrate these science experiences with our study of poetry.

Writing Poetry About Rocks and Earth Materials

As we considered how this integration of poetry and science would work best, we were guided by the idea that poetry provides a way to blend observations of our world with our feelings. In Awakening the Heart (1999), Heard says, “The work of teaching poetry is the work of letting knowledge pass through our hearts…” (p. 118). While we were particularly excited about merging our poetry genre study with our rocks and earth materials unit, we were not sure how to make this leap.

FIGURE 2.

A student’s six-room-image poem.
We decided to modify a strategy Heard suggests in her book, the six-room-image poem. The idea behind this strategy is that you consider six different perspectives when describing something special or memorable. You divide your paper into six boxes or rooms, which in the original version include image, light, sound, questions, feelings, and repeating word(s). We thought this overall idea would work with rocks but revised the rooms to fit our specific topic and science standards better. Keeping the focus on questions, feelings, and repeating words, we changed the other rooms to colors, other properties, and comparisons. To introduce the writing strategy to students, we modeled completing the six-room-image poem using a seashell as an example. Students then used this strategy to describe their pet rocks (Figure 2, p. 41).

The six-room-image poems launched us into thinking poetically about rocks, but there was more work to be done. We led a class mini-lesson in which we collaboratively noted and then circled the poetic language in our seashell six-room-image-poem. As we talked through this process, we began playing out loud with the words in a manner we decided to call writing in the air. “Maybe,” we said, “our descriptive colors make a poem all on their own? Marshmallow white, brick red, chocolate brown, storm cloud gray... but how would we end it? Maybe by just saying ‘seashell?’ What do you think?”

We bounced ideas around the class and created four different poems in the air in this manner, all from our one six-room-image poem page. As teachers, we were excited and surprised about these poems emerging from our class conversation. The students went off to their physical education class, and we immediately wrote down the poems we had been creating orally. When students returned, we showed and read the written work to them. They went off and began a similar process with their own six-room-image poems, first noting the poetic language and then talking through and writing their poems.

Given their young age, we wondered how much revision and editing we would have the students do. While we had many revision ideas from Heard’s book, would students be up to the challenge? We soon discovered that many of them were quite ready to reread and rethink. We modeled revision in a class mini-lesson and worked with students...
in small-group and one-on-one conferences on revision strategies that included marking and rewording places that did not sound right or make sense, changing the sequence, and adding elements such as an ending, repeating words or lines, and line breaks. When poems felt “done” to students, they chose to either type or write their final versions (see Figure 3).

With all the poems filling the room, some with science connections and others about a range of topics, we decided it was time for our own class Poetry Slam! Students chose poems to share and rehearsed. We brought in a microphone system, author’s chair, and snacks. We taught the students about the poetry slam tradition of snapping after an author shared. They read their poems and celebrated their hard work. When we asked if they thought we should do a Poetry Slam again, the overwhelming response was, “Yes!”

**Assessment**

While we knew students enjoyed these activities, we also needed to be sure they were learning. Assessment occurred in multiple forms, including ongoing observation, writing conferences, and review of written work, with records kept through anecdotal notes. For more formal evaluation, we developed a rubric that allowed us to systematically consider standards and student progress toward them (see NSTA Connection). The rubric scores were derived from a range of products including student science notebooks, anecdotal notes, writing drafts, and published pieces.

**Reflections**

When we first planned this integrated science and writing unit, we imagined the possibilities, yet we were not sure of what the first graders would accomplish and learn. We also worried about requiring a specific science topic for their poetry writing since choice is a crucial part of writers’ workshop. In the end, we discovered that writing poetry provided an engaging and creative outlet for processing and sharing the observations made during scientific investigations. Students engaged in scientific practices such as asking questions and carrying out investigations. They wrote and published poems that included scientific information about rock properties and also successfully incorporated key elements of poetry.

If teaching this unit again, we see potential to more explicitly identify a range of poetry focuses such as rock properties and descriptions (as we did this time), the uses of rocks, and the importance of rocks. We also see potential for them to write in partnerships or small groups instead of just on their own. As we look to the future, we imagine a slightly revised process in which we have all students spend time exploring the writing of poetry about a science topic such as rocks but provide more options to them for their published pieces. For writing purposes, we would want all students to publish poems, but some may not want to publish poems specifically about rocks or Earth materials. For science purposes, we would want everyone to publish a piece about rocks or Earth materials, but they could choose from a range of options such as poems, informational texts, or posters.

Finally, when reflecting upon this work, we clearly see the power of collaboration between teachers. By making time to co-plan, co-teach, and collectively reflect, we were able to do so much more than any of us could do on our own. The process was thought-provoking and energizing. Poetry rocks!
Connecting to the *Common Core State Standards* (NGAC and CCSSO 2010)*:

The materials/lessons/activities outlined in this article are just one step toward reaching the ELA Common Core State Standards listed below. Additional supporting materials/lessons/activities will be required.

<table>
<thead>
<tr>
<th>Writing</th>
<th>Connections to Classroom Activity</th>
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</thead>
<tbody>
<tr>
<td>W.1.2</td>
<td>Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.</td>
</tr>
<tr>
<td>W.1.5</td>
<td>With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed.</td>
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<tr>
<td>W.1.7</td>
<td>Participate in shared research and writing projects.</td>
</tr>
<tr>
<td>W.1.8</td>
<td>With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.</td>
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<tr>
<th>Reading Literature</th>
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<tr>
<td>RL.1.4</td>
<td>Identify words and phrases in stories or poems that suggest feelings or appeal to the senses.</td>
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<tr>
<th>Speaking and Listening</th>
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<tbody>
<tr>
<td>SL.1.4</td>
<td>Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.</td>
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<tr>
<th>Science Trade Book Recommendations</th>
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*Additional possibilities depending upon teacher goals and the needs and abilities of student.*
Connecting to the Next Generation Science Standards (NGSS Lead States 2013):

2-PS1 Matter and Its Interactions

www.nextgenscience.org/2ps1-matter-interactions

The materials/lessons/activities outlined in this article are just one step toward reaching the Performance Expectations listed below. Additional supporting materials/lessons/activities will be required.

<table>
<thead>
<tr>
<th>Performance Expectation</th>
<th>Connections to Classroom Activity</th>
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<tbody>
<tr>
<td>2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</td>
<td>• observe and describe rock and soil properties such as size, color, texture, and hardness.</td>
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Science and Engineering Practices

Planning and Carrying Out Investigations
Analyzing and Interpreting Data

• collaboratively observe and collect, analyze, and interpret data to answer the questions:
  ♦ What are the properties of rocks?
  ♦ How do we use earth materials?
  ♦ Is soil a type of rock? How is soil different than rocks? What is in soil?

Disciplinary Core Idea


• Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.

• investigate rocks and soil and describe their observable properties.

Crosscutting Concept

Patterns

• identify patterns in the observable properties of rocks and soils.

• investigate ways in which Earth materials are used in their school environments and the larger world.