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ROCK HOUND WRITERS

Mary Mercereau-Kempf and Kay Harley

"Why not?" was the intriguing question my professor had penciled in the margin of my journal. I had been using the journal in a graduate teacher/researcher course to record my research on the effect of using writing as a tool for teaching science in my third grade class. The entry that provoked the question read:

It would be fun to use their research about rocks as a springboard for writing reports/factual pieces, but I can't afford to give them the time in Science and don't want to use Writing Workshop time.

My professor's response—"Why not?"—made me reconsider.

I had spent the summer helping rewrite the K-6 Science Goals and Objectives, and was eager to teach the new science program. Many of the new objectives included a writing component; for example:

(4th grade) Describe in writing what would happen if one segment of the food web were removed.

(6th grade) Write two ways that you resemble your parents and grandparents. Explain how that trait is passed on from generation to generation.

I hoped to go beyond these objectives but was frustrated because most of my instruction time was divided into neat parcels to fit the School District's guidelines, with only 5% of third grade time allocated for science. I hesitated to "borrow" time from other subject areas to focus on science. From this dilemma emerged my action research focus:

- 1) Could pooling time allocated for language, reading, penmanship, math, and science for a science unit on rocks meet many objectives from across the curriculum at one time?

- 2) Could replacing fill-in-the-blank dittos and simple questions at the end of the chapter with writing foster more effective learning of science?

With new resolve I asked my third-graders if they would be interested in becoming rock experts. They would then "teach" each other their newly found knowledge. Enthusiastically, they accepted the challenge.

Initially I had the students freely explore material on a range of reading levels, including fiction and non-fiction books, magazines, filmstrips, videos, and newspaper articles. At the end of about 15 minutes of exploration, I would mention what I had discovered and what I would be looking for the next day; then several students would also share what they had discovered. This helped to establish some familiarity with rocks and created interest. By the third day it was hard to get the class to stop talking about rocks.

Then I asked the students to pretend they would have a chance to meet a famous rock expert and write the question they would most like to ask. "What makes a volcano erupt?" "Why is sandstone different colors?" "How far would you have to dig if you wanted to dig to the center of the earth?" "If pencils aren't made of lead, what are they made of?" Instead of producing the expert, I asked my students to find the answers to their own questions.

The class headed back to the books. They continued to read, read, read. Although most needed guidance to find helpful sources, they enjoyed looking for answers because they cared about the questions. Now it was more like a treasure hunt than an assignment. My role became that of facilitator. Instead of giving lectures, I circulated among the class to help sound out words, suggest alternate sources, celebrate discoveries, and encourage distracted students. As students sorted through sources, they discovered how to preview books; for many it was the first time they had wanted to use a table of contents, index, or card catalog. All students were anxious to find material with answers to their particular questions. Because I had limited their exploration to two more days, reluctant readers were suddenly reading in their free time!

After getting a taste of research, some students needed to rewrite their questions to make them more manageable. The concrete example of a camera helped them understand how to narrow a broad topic. Students scanned the room using their eyes to see as much as possible. Then they took turns looking at the room through the viewfinder of a camera and noted the

differences in what they could see. My mini-lesson compared scanning the room to the broad question "What is a volcano?"; looking through the viewfinder was like asking "How do you know when a volcano will erupt?"

I found it was important to be flexible as the students requested two more days to search for answers. They kept reading, often tried new sources, spontaneously shared new discoveries and interesting facts, and recommended books to each other. With the research time expanded to 20 minutes a day, I was surprised to hear groans when it was time to start a different subject or go to a special class. On the final day of research the class even voted to shorten recess!

We had been using a writing process/workshop approach for four months so students were familiar with planning, drafting, revising, editing, and sharing their writing. The day of reckoning came when it was time to turn their ideas gained from research into meaning on paper. For the first writing session I encouraged them to jot down ideas without worrying about complete sentences. I assured them that at this point it was not important to have everything in the right order, interesting leads, or the correct punctuation. The only rule was they were NOT allowed to copy any information. The second step was to write a draft, expanding their ideas and connecting them. After completing the draft, students revised alone and then with a partner, deciding if they had actually answered their original questions so their writing could teach others.

After revising they were ready for group share. I read each report aloud without the title. The class would try to guess the subject or main idea. This helped the student decide if the report made sense. Earlier in the year, the class had discovered what made writing interesting and easy to understand. They now applied their criteria for "good" writing to the reports, pointing out positive areas along with areas that needed further clarification. Next the report was handed in so I could make editing corrections and revising comments. Finally I conferred with each student. The student then wrote the second draft. Usually the report was now ready for publication. If clarification was still needed, the student would go back through the process as far as necessary. One student chose to start over.

Since I used a process approach, students proceeded through the stages at different rates. A few finished in two days and most were done in a week. Each day I tried to give the students an hour to work on their reports.

Frequently they returned to their sources to check or add information. Although this was an "in class" project to guarantee the students' own work, some students became so enthusiastic they smuggled books and drafts of their reports home to have more time. Others brought books from home or the public library. Jason even called his uncle to borrow a book, and Amanda interviewed her parents.

Throughout the project I taught mini-lessons in response to my students' questions and needs. By integrating spelling, penmanship, and language arts time with science, I was able to use the rock reports as a vehicle for teaching skills in all of these areas. Consequently I might help with leads during science time and discuss volcanos during penmanship. While circulating among students, I could quickly confer and thus work individually on spelling and mechanics, teach a missing skill, or ask and answer questions.

The final reports were illustrated, which was especially helpful for students who had difficulty writing. Individuals again went through a process to decide what would be most effective. Jason made a bar graph to show that sulfur was hard to find in North America, and five students included keys to explain how to read their pictures, distinguishing such things as the parts of a volcano. By themselves they applied skills learned in other content areas, recognizing how helpful graphs and keys could be to teach others information. Such "real" applications of these skills will make my students more likely to use and understand them in the future.

Soon the reports were published and compiled into a book. Each report was typed by members of the high school co-op, and each typed copy was then illustrated by its author and duplicated. Each book also included a title page, table of contents, and dedication page. With pride each child received a personal copy, placed in an inexpensive folder. One copy of the book, in a three-ring notebook for durability and with a special cover illustration by the art teacher, became a permanent part of the school library, complete with three cards in the card catalog.

We were all so delighted with our work that we decided to share our new found expertise with others. We invited parents to a "Rock Party" where children enjoyed teaching their parents for a change. They read their reports while transparencies of their illustrations were projected. The interest was

still high so we took our "Rock Show" on the road to the first grade, teaching what we knew and presenting the first grade with a copy of the book.

By the time this project was over, my research questions had been answered. By integrating subjects and pooling time, I could expand the time spent on science while still meeting the objectives in other subjects. Moreover, using writing in science could effectively replace dittos and simplistic questions in the text.

As a teacher I had taken a risk. I had expanded my 5% of instructional time for science into several other areas. But the benefits were many. First, students were reading, writing, speaking, researching, spelling, practicing penmanship, and learning science in one integrated activity. They clearly saw how different subjects and skills were interrelated. What a bonus for third graders to sustain a train of thought by daily spending significant periods of time on a project. Combining time from different subjects also let us complete the rock project in a few weeks while enthusiasm was still high, instead of dragging it out for a month or more.

A second benefit of having the students go through the process of researching, writing, publishing, and teaching their rock reports was that we covered much more information than the textbook. The text never mentioned mica, sulfur, or asbestos, the subjects of three of the reports. The reports also allowed students to extend concepts introduced earlier and practice new science vocabulary in a meaningful way. Steve described fossils as "rock pictures"; Travis warned, "When steam comes out the top of a volcano it is time to RUN!"; and Adam used a map to find where a river went.

A third benefit of the project was that it was student-centered. Students chose questions, found answers, and used the knowledge they acquired, rather than focusing only on what the teacher or textbook thought was important. Thus, the responsibility for learning and teaching was shifted from the teacher to the student. Being allowed to choose their own questions—"Why are diamonds so expensive?"—let students feel in control of their own research. As a result, they invested a great deal of time and energy and felt proud of the completed work, both individually and collectively.

Finally, the rock project developed both critical and creative thinking skills. Students sifted through a variety of information, decided what was

most important, and then communicated the information to several audiences in a lively way. The research introduced many of the students to non-fiction books, showing them an exciting world beyond the textbook or encyclopedia. Writing and teaching what they had learned forced students to translate difficult material into their own words, thus insuring the information was expressed in terms appropriate for their level. In the end, they were able to express facts in language they all could understand and will remember.

Looking back over my action research project, I discovered that I, like my class, had benefited in many ways. As part of the project I kept a journal in which I recorded and reflected on what was going on in my classroom. Writing in the journal helped me organize my thoughts; referring back to it let me analyze what could be improved and what I would like to try again. This led me to realize that, in order to grow professionally, a systematic review of my classroom is essential. The review becomes even more valuable when, like the students' rock reports, the process starts with a question I care about, and I can collaborate with other teachers engaged in a similar process.

As a result of this classroom research, my role as a teacher will change. I hope to encourage students to take more responsibility for their own learning by providing them with choices when appropriate. I plan to look for ways to continue integrating subject areas, for I believe a rich, integrated language arts context can best foster learning throughout the curriculum. I will also remember that important learning can take place even when I am not teaching.

Even after our rock project was over, the class continued to ask questions and look for answers which often led to new questions. Perhaps this is what was most important: my students were learning how to learn. Centering on rocks let students realize that learning is not confined to a textbook chapter, a worksheet, or a test at the end of the unit. Subjects are not isolated; reading and writing and math and science all tie together. As my students tied their learning together, they had a glimpse of what we know: no learning is ever really finished.

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