

Writing Boosts Learning in Science, Math, and Social Studies (Council Chronicle, Sept. 2006)

Keeping Notebooks, Explaining Incorrect Answers, and Doing Community Work Provide Opportunities for Students to Express What They Know

by Peggy Harris

Michael Klentschy believes that the language arts, with their focus on discourse and talk, are the perfect conduits for investigating and understanding scientific concepts.

Klentschy is superintendent of schools for El Centro District in California, which is 116 miles east of San Diego. For more than a decade he's spearheaded the Valle Imperial Project in Science (VIPs), a professional development program for teachers that includes learning to incorporate student science notebooks. The program is a collaboration between 14 school districts, Imperial Valley College, and San Diego State University's Imperial Valley campus.

As Klentschy explains in an article in *Science and Children* (November/December 2005, published by the [National Science Teachers Association](http://www.nsta.org/) [<http://www.nsta.org/>]) "The science notebook is more than a record of data that students collect, facts students learn, and procedures students conduct. It is also a record of students' questions, predictions, claims linked to evidence, conclusions, and reflections—all structured by an investigation leading to an understanding of 'big ideas' (not factoids) in science. A science notebook is a central place where language, data, and experience work together to form meaning for the student."

As the project has been phased in, test scores have risen in the district, including scores in reading and writing. Klentschy thinks the improvement can be credited to an emphasis on expository writing and working through the logical sequences of scientific experiments.

"We do a lot with claims linked to evidence and conclusions linked to that. Oral language and written language give students a chance to come up with questions, explain predictions, and come up with new information to support learning." He also sees reading skills grow when students build language and comprehension strategies as they work through cause and effect relationships. "Their first-hand experience lets them use language, especially scientific language, in context."

This is especially significant, Klentschy says, with the increase in English Language Learners. He points out that the word "scale" can mean a lot of different things—a bathroom scale, a scale on fish, or a rough texture. Hands-on experiments provide opportunities to integrate language into the context in which it's being used, he says.

"Having Us Write" Was Unique

Elizabeth Molina-De La Torre was a second-grade classroom teacher and pilot teacher for VIPs. She remembers the difference the program made to her teaching and her students' learning.

She had been teaching from an old pre-packaged kit that had been in her classroom for six years and "was missing 90 percent of the materials" she needed. She recalls that the textbook wasn't hands-on and didn't present open-ended questions. Rather, it was "very scripted and factoid based."

VIPs, she says, provided all the materials and an initial six hours of training for each unit she was expected to teach. The units were delivered to her classroom, and she received a visit from a science resource teacher who helped her implement the program, manage the materials, and set up.

"I was provided with training, materials, and support to implement science in a hands-on model in my classroom. . . . What

was different was that it allowed my students to explore their questioning while still staying with the big idea of the unit I was teaching at the time.”

Currently, Molina-De La Torre is VIPs coordinator. Her role is to supervise the resource teachers who help classroom teachers implement the program.

She explains that writing is a central part of VIPs professional development as well, which helps to illustrate for educators the learning students will be doing. Of her own training experience she recalls: “The presenter didn’t say ‘this is what the teaching guide says.’ She was giving us her experiences. She had taught the unit for many years and was telling us what went well and what didn’t.

“That was unique, and so was her having us write. We didn’t realize until the end that we were doing the scientific process—posing a question, creating a plan, collecting the data, using this data in doing the experiment, and trying to write a conclusion. The writing part, putting voice on paper, wasn’t someone telling us what we were learning; it was us documenting what we were learning.”

Writing in Math Class

Terri Faitel tells her eighth-grade math students at Boyd Arthurs Middle School in Trenton, Michigan, this joke: “Where there are lines, I want words.” Only she’s not kidding. She has all her classes—two algebra, one math 8, and one special education math class—write throughout the school year.

To help students “recognize practices of collecting and displaying data that may bias the presentation or analysis,” as dictated by Michigan’s Grade Level Content Expectations, Faitel has her students study the Challenger space shuttle. After watching a video that tells the Challenger’s story, students pursue a variety of mathematical activities.

“For the constructed response assessment, the students made a scatter plot to reconstruct the analysis the engineers and scientists at NASA and the Morton Thiokol Corporation used to decide whether to launch the shuttle. This first scatter plot only contained seven pieces of data in which O-Ring failures were graphed. Statisticians know that all the data should have been used to make an analysis. There were 23 flights that should have been graphed. The remaining missing 16 pieces of data were cases in which no O-Ring failures occurred.”

Students created both a graph mapping O-Ring failures and a graph including all 23 flights. Based upon this information, students answered these four questions: (1) Using the data from your scatter plot, defend the position of the engineers who wanted to launch the Challenger. (2) Using the same data from your scatter plot, defend the position of the engineers who did not want to launch the Challenger. (3) You are a member of the Rogers Commission; compare the two graphs by using the data. (4) Would you have recommended launching the Challenger?

Some of Faitel’s lessons have students teasing that they are learning about pronouns in math class. This is because Faitel doesn’t allow students to use pronouns when writing about their discoveries via a geometry computer program. “The students want to say things like, ‘they are equal’ when making references to angles. However, in a polygon, there are interior angles, exterior angles, angles formed by the diagonals, etc. [For this reason, students] have to get very specific.” Faitel also has students analyze distractors on multiple choice practice tests for the Michigan Educational Assessment Program (MEAP), which means after showing all their work for the correct solution, students must explain why the other solutions are incorrect. She notes that she has “some fabulous responses” from students throughout the years.

Faitel stresses that she gives very detailed feedback so students know she isn’t assigning writing as “just something to do.” She also engages students in self-assessment, asking them to write about their learning goals and strengths and weaknesses when studying a topic. She says students’ responses about their math learning advance her own learning as a teacher.

Writing in Social Studies

Dave Winter, who teaches social studies at Henry W. Grady High School in Atlanta, Georgia, teaches writing in a variety of ways. Students write to kick-start class discussions and to practice document analysis and interpretation. He also asks students to respond to historical letters as if they were living in the time and to write slave narratives, which involve creating an autobiography, historical setting, and believable sequence of events including an escape and a reflection on slavery after achieving freedom. In addition, students research Civil War photographs and use their findings as inspiration for writing poems in the style of Walt Whitman or Emily Dickinson.

Winter has found that recreating a constitutional convention can provide a springboard to authentic historical writing. When students take the role of a delegate to the convention and write and deliver speeches and debate the major points of the convention between speeches, he says they “are often surprised to find how persuasive they sound when using rhetorical strategies effectively.” Winter, who is co-editor of the NCTE book [Writing Our Communities: Local Learning and Public Culture](http://www.ncte.org/store/books/118909.htm) [http://www.ncte.org/store/books/118909.htm], says, “the community-studies work that came out of the book was a real chance for students to write to an audience beyond their teacher and his red pen.”

For one effort students participated in an oral-history project about the Atlanta Child Murders. “Students were assigned the task of interviewing a local figure—a family member or local celebrity such as a former news reporter, broadcast journalist, or local government official—about their memories of the murders.

“The writing the students produced was phenomenal because they imagined a broader audience and wrote to it. We actually learned that [a parent of Grady High School students] was a prosecuting attorney in the murder trial that convicted Wayne Williams of two of the Child Murders. Another [parent] was the special investigator hired by parents of the victims to uncover the truth. Other students interviewed Cynthia Tucker (now editorial page editor of the Atlanta Journal-Constitution, then a news reporter covering the mayor’s office), Richard Belcher (the TV reporter who covered the murders for WSB-TV in Atlanta), and John Sweet (the city councilman who created a controversy by inviting the Guardian Angels to come to Atlanta to protect the neighborhoods where the murders occurred). The pieces were published in the newspaper I advise and were widely praised as teaching students about a period of history that many Atlantans forgot or never knew.

“When you open the door to this kind of inquiry, students will write their very best because the audience is real and the need they are serving by writing is real. They are uncovering a story and telling it. That’s what all good writing activities must do.”

Winter and his students have moved on to a new project—working as part of a citywide initiative to remember the Atlanta race riots of 1906 on the 100th anniversary of their occurrence.

Winter says his students aren’t too surprised at the amount of writing they are asked to do in social studies classes, mainly because the classes are advanced and students know that he’s been publications adviser for 14 years and values the craft.

Writing allows us to understand the past, Winter says. “I spent my life as a student and as a teacher straddling the divide between literature and history. You can’t appreciate history without studying literature.”

Comments

Most Recent Comments (0 Total Posts)

There are no comment postings on this page yet.

Copyright © 1998-2011 National Council of Teachers of English. All rights reserved in all media.

1111 W. Kenyon Road, Urbana, Illinois 61801-1096 Phone: 217-328-3870 or 877-369-6283

Looking for information? Browse our [FAQs](http://www.ncte.org/faq) [http://www.ncte.org/faq], tour our [sitemap](http://www.ncte.org/sitemap) [http://www.ncte.org/sitemap] and [store sitemap](https://secure.ncte.org/store/sitemap) [https://secure.ncte.org/store/sitemap], or [contact NCTE](http://www.ncte.org/contact) [http://www.ncte.org/contact]

Read our [Privacy Policy](http://www.ncte.org/privacy) [http://www.ncte.org/privacy] Statement and [Links Policy](http://www.ncte.org/links) [http://www.ncte.org/links]. Use of this site signifies your agreement to the [Terms of Use](http://www.ncte.org/terms) [http://www.ncte.org/terms]

This document was printed from <http://www.ncte.org/magazine/archives/WritingBoosts>.