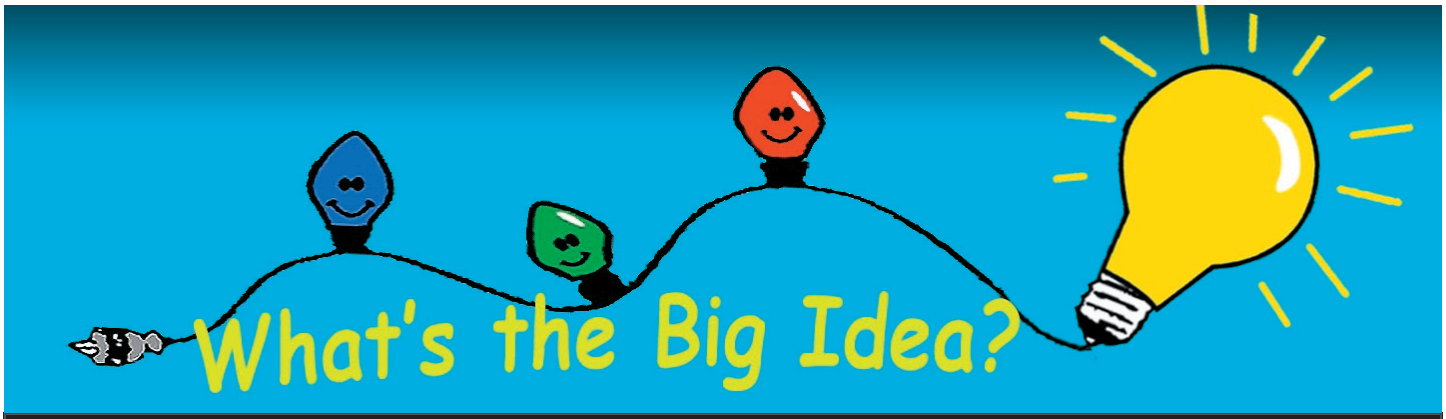

A Publication of the K-12 Alliance: A WestEd Program

JUNE 2011 • VOL. 10, NO. 5

Notebooking: Voices From the Field

Editor's note: Our series on sense-making notebooks is coming to a close. This school year and last, we delved into what makes these items so important to students and teachers. Overall, notebooks are a place where students can gather data, communicate their understanding, and reflect on what they learned. For teachers, student notebook entries are windows into student thinking, providing valuable information about what they know and don't know.

Previous articles explored the transition from "teacher directed" to "student directed," notebook entries for experimental design including observations, displaying data, selecting and developing graphs, writing summary statements and conclusions

In this final article, we look at reflections from teachers in the Coachella Valley Unified School District. The K-12 Alliance has worked with several schools in the district through MSP and CPEC grants, as well as the FOSS Leadership Academy. This article includes descriptions of student work from those who were beginners at notebooking to those more experienced students. The article also presents teacher reflections about the complexity of using notebooks for the first time to transitioning to sense-making notebooks that promote student thinking.

Tansitioning from the Beginning

Typical of any new routine in the classroom, implementing notebook usually begins with teachers finding a way to manage the challenges of the materials and to build consistency. At first, teachers see the benefits of writing in notebooks as targeting student organization, or for building student memory based on what the teacher asks students to write. In the beginning, it is hard for students and teachers to see the need for a deeper level of reasoning or reflecting. The teacher's job is to help students transition from formatting to sense making.

Jenny Lopez, a teacher at Caesar Chavez School in Coachella Valley Unified School District, lived through these experiences. She explains the transitions for her students and herself as students developed thinking skills through their use of notebooks in her multi-year program:

"During the first year, it's difficult for students to understand that their reasoning and reflections are what matter. Student note-taking usually has lots of illustrations and labeling where student thinking is not visible. Additionally, they do not see the need to keep a notebook, much less an organized one. Students, and even parents, give more importance to textbooks. At the same time, teachers are often concerned about table of contents, page numbers and management of notebooks rather than reflections on their students' learning.

I've learned that it's the instructor's attitude that determines the students' view on their notebooks. During the first year, both younger and older students need lots of support and guidance when writing in their notebooks. This support and guidance can be done through the process of modeling. The modeling is not to record the teacher's thinking, but rather to show students how to document their own thinking and understanding about the science. It is not unusual to model note-taking since students do not understand that their notes reflect their processing of information.

Second year note-taking in science notebooks includes more writing. Illustrations are not as big (in size) as first year notes. Students spend more time describing what they have learned. In addition, students feel confident enough to refer to their notes rather than, or in addition to, the text book."

"Voices From the Field"

We asked teachers at Chavez and Oasis School in Coachella Valley USD, who were new to the use of science notebooks, for their reflections on the first year of implementing notebooks.

Their comments mirror year what Jenny expressed about the early stages of implementation: students are engaged in science ideas and tasks and their notebooks are used to record information, but not necessarily synthesize their learning. Teachers tend to manage the "table of contents," page numbers, etc., and have difficulty encouraging students to document their thinking.

SEE NOTEBOOKING, PAGE 9

IN THIS ISSUE...

DIRECTOR'S COLUMN

The Data Don't Lie

By Kathy DiRanna

I was sitting at the computer, trying to put into words what it means to enter our 25th year of service to the State of California, and to the nation in math and science education. It's hard to capture the impact of this organization.

And then as fate would have it, I got several emails and a list from Doris.

The first email came from Betsy Fulwiler, an expert and published author for science notebooking. We had invited her to present to a staff developer training. I had written an introduction of who we were and how we could use her expertise. She responded: "I met you in the spring of 1999 when I was a new science coach and Elaine Woo had you come to Seattle to help us." I still have the file. I responded: "That was ages ago." Her reply: "And yes, it was ages ago, and you (the K-12 Alliance) were already a legend then."

The second email came from Scott and Helen Hays, who have been connected with us since the beginning, first as singles, and then as a married couple (I was their best man and David Pummill was the minister).

Scott wrote,:"I think this address might still work, but if not, I'll keep this short. I worked at the Oregon Zoo last year as a 'naturalist.' Helen and I each took turns over the winter being the lead author for a series of conceptual units the Zoo wanted written for online access. This summer, I am back at the Zoo doing the same thing. Helen is one of three consultants for the Zoo's summer camps and she is in charge of curriculum and staff development. Today she worked with grade level team leaders levels, and they built a PEM. Tomorrow they are building a Content Matrix (the forerunner of the conceptual flow). They will then develop their daily lesson plans based on the CM. Good ideas never die. Thought you'd like to know."

Yes, Scott and Helen. I really did like to hear that.

As it happened, Doris was preparing a list to determine who would receive our longevity awards for being a staff developer or cadre member. For five years of service, it's the What's The Big Idea? watch; for ten years, it's a silver train bank decorated with light bulbs. For 15 years, a set of yellow scrubs signifies that you have experienced a least the equivalent of a medical degree. At 20 years, it's a crystal diamond paper weight. Who knows what the 25th year will be?

Doris sent an email: "On my watch/train list, there are over 1,000 names of staff developers and cadre that have at one time or another (or still!) worked with the K-12 Alliance. That's a gang o' teachers!" To which I replied: "Impossible!

I knew we had touched thousands of schools (elementary, middle and high school), hundreds of teachers and millions of students. But I didn't think we had had more than 1,000 teacher leaders as staff developers and cadre members. So I asked for the list.

I was blown away at how a simple data table can carry so much information—who attended, what years, for how many years, who overlapped whom, who had a break in participation but came back, who entered early and then found other career paths, who is just now entering on their leadership journey.

As I looked at the years, our history unfolded before my eyes—the Camelot years (1987-1995) of thinking-meaning centered curriculum (TMCC), authentic assessment (remember the hands-on CLAS state assessment?), whole language, math manipulative and science kits. That was the time the nation envied how California approached education.

Then came the lean years (1996-2005) when politics reared its ugly head resulting in non-sensible standards, robotic teaching and large-scale assessment. The new millennium, which touted No Child Left Behind (NCLB) as a savior, resulted in most students left behind as schools limited curriculum to reading, writing and

SEE DATA, PAGE 10

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WHAT'S THE BIG IDEA EDITOR
Brenda Rees

"What's The Big Idea?" is an independent publication sponsored and paid for by the K-12 Alliance.

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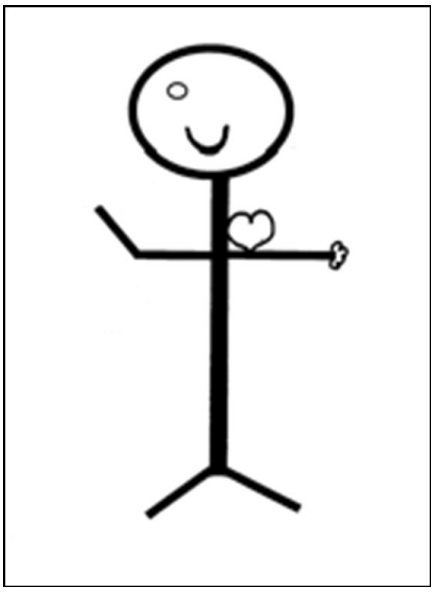
What is the Climate at Your School?

By Jo Marie Topps



School Demongraphic Boxes

With regards to the above questions, I am not talking about the temperature or relative humidity at your school, but rather the climate for innovation, change and sustainability of best practices for student learning.

In this era of common core standards, test-driven instruction, and data driven decision making (just to name a few), teachers are faced with a barrage of new information and responsibilities that affect every move they make in the classroom. To handle this onslaught, highly effective leadership teams use different types of processes to pay attention to and handle~~the~~ information coming down the pike from the district or state.

A great way to encourage discussions about your school climate is the "Body of the School" process, a non-threatening, leadership activity. The example provided here focuses on the use of collaborative inquiry and data-driven decision making; other topics may be inserted to reflect the context at your school.

To begin the process, have the team draw a stick figure on a piece of chart paper (see below). Prompt the team to discuss and answer the questions provided below. Have the team write their responses on the stick figure on the appropriate body part.

Head: What do you want to learn about data and collaborative inquiry?

Eyes: What types of data are you looking at?
What are you seeing in terms of equity?

Mouth: What are people in your school talking about?

Hand: What are you doing in (discipline e.g., science) improvement?

Heart: What are you excited about at your school?

Stomach: What at your school gives you a stomach ache?

Right Foot: What action steps do you want the data team to help you take?

Left Foot: Where do you feel stuck in this process?

Next, consider the demographics of your school. Complete each of the School Demographic Boxes with the following guiding questions/prompts:

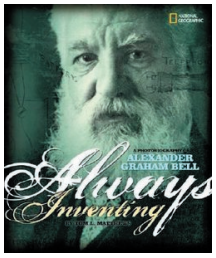
- Who are your students?
- Who are your teachers?
- Describe the community (e.g., parents, business).
- Describe the school culture.

Grade level teams, department teams, or any group in need of conversation about the climate at the school can participate in this process. Be sure to have teams share their discussions and "Body of School" illustrations! ■

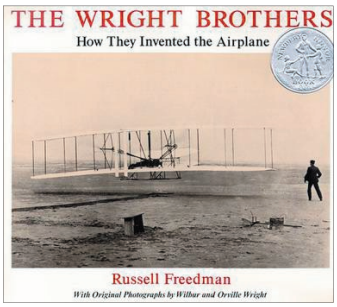
Using Science Text for Literature Circles

By William Straits and Britian Bombard

The National Science Education Standards suggest that science teachers use "historical examples...to help students see the scientific enterprise as more philosophical, social, and human" (NRC 1996). Fortunately, science-related, historical nonfiction has become a popular literary genre and teachers have a wide range of options to help learners of all ages and reading abilities to explore the history and nature of science.



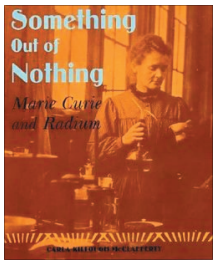
As a starting point, consider reviewing the titles included in NSTA Recommends (www.nsta.org/recommends) or for use with young adolescents, consider the list below. Just reading these books alone, however, does not necessarily lead students to make personal connections to science and "see the scientific enterprise as more philosophical, social, and human." Students' must be guided to specific aspects of science while reading and discussing books.



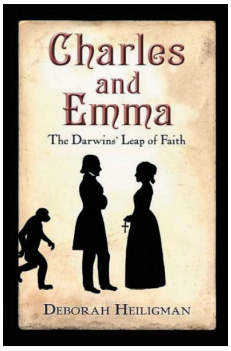
One way for teachers to focus their students' attention on key components of the history and nature of science is through the use of literature circles.

To be successful with literature circles, you have to pick the right text. Texts should align with students' reading interests and abilities, and importantly the topic(s) covered in the text should parallel concepts taught in class. If you are not familiar with your students' reading abilities, ask colleagues and/or review student files.

Gve students a choice in text selection and encourage them to select texts at their reading level. Also, classroom instruction about atomic theory, isotopes and radioactive decay can be supported with literature circles reading books that describe Marie Curie or the Manhattan Project. Finally, don't judge a book by its cover; be sure to read the books yourself before assigning them.



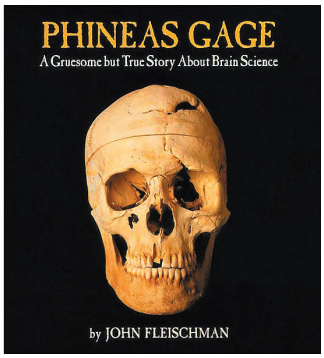
Although literature circles have been used with students from kindergarten to college, the examples below stem from our teaching experiences with middle school students. Many great books are available for young adolescents that can be used to support science teaching (see Table 1, page 8).



Literature circles work well in my middle school grade science classroom. As hands-on inquiry activities are central to my teaching, my class already has lab groups created and that structure carries over easily into the small groups needed for the literature circles.

Roles for each student are printed on index cards, shuffled and handed out each time the groups meet to ensure rotation. During our literature circles, approximately 60 minutes each week is set aside for discussions. Since the shortest block of time set aside should be 20 minutes, we use warm-up time on Monday, Wednesday and Friday. This helps to ensure that students are reading regularly and allows class discussions/activities afterward to build on ideas discussed in those small groups.

In a seventh grade classroom, a literature circle could focus on evolution and Charles Darwin. Numerous biographies of Darwin are available for readers of all levels. A quick sampling includes: Who Was Charles Darwin? by Deborah Hopkins (for readers below grade level), *Charles Darwin And the Evolution Revolution* by Rebecca Stefoff (for readers at grade level) and *Charles and Emma: The Darwins' Leap of Faith* by D. Heiligman (for readers above grade level).



After completing the books, students work together to create a presentation of their understanding of Charles Darwin and/or evolution by means of natural selection. Examples of group presentations include a talk show with guest star Charles Darwin, a skit of Charles Darwin on the Beagle talking to shipmates about his observations, or a newspaper created with various articles related to the text they read or from their conversations.

Literature circles about Charles Darwin lead to some interesting discussions about evolution and have encourage my students to be more invested in the learning about this big idea in science.

SEE CIRCLES, PAGE 8

Hard Working Partners, One Great Conference

Organizing a CSTA conference is not a small undertaking. Past conference chairs have bravely taken on the herculean task alone. This year, however, we will all benefit from a collaborative effort between Laura Henriques, professor of Science Education at CSULB and President Elect of CSTA, and Dean Gilbert, Science Consultant, Los Angeles County Office of Education, CSTA Region 3 Director. They are teaming together to make the 20th annual CSTA conference one to remember!

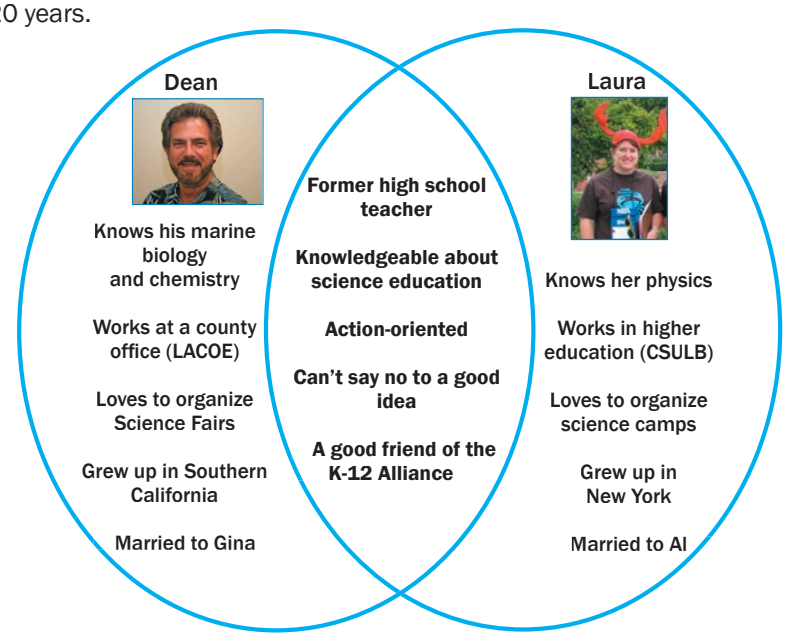
Chances are if you are involved in science education, particularly in Southern California, you already know at least one of these individuals.

Laura taught middle and high school physics and physical science on the East Coast before going to Iowa to get her PhD in science education. Laura is currently serving as Chair of the Science Education Department at CSULB. Dean, a native of Southern California and alumni of UC Irvine, worked in Long Beach Unified for more than 25 years as a high school science teacher and at the district office as the science coordinator. He is also recent Past-President of the California Science Teacher's Association and served as the California delegate for the National Science Teachers' Association Congress on Science Education.

Overall, each member of this dynamic duo brings different strengths and focus to the conference. Laura's strength is in physical science content while Dean's expertise lies in life sciences; Laura brings university/pre-service expertise to the table while Dean uses the county lens to identify and address the needs of K-12 teachers.

Laura and Dean share a common ultimate goal: providing meaningful science experiences for preK-16 students. Both are ready for the challenge of hard work and reality won't limit their vision. Through the years, conference leaders have brought their own unique set of experiences and skills to the task; this particular pairing demonstrates how individuals working together can produce much more than those working alone. The sky is definitely the limit for this year's conference!

The K-12 Alliance has been lucky to collaborate with Laura and Dean in a variety of projects over the years. Laura has served as a Cadre member and partnered on various grants and programs since coming to California in 1995. Dean has partnered with CSIN, SPAN, SS&C, and the K-12 Alliance on a variety of projects spanning more than 20 years.



SEE COLLABORATION, PAGE 10

Ask a Cadre: Power Magnets on Your Fridge

Dear Rod:

When a magnet sticks to the refrigerator, is it still north and south poles making the attraction (one magnet, other refrigerator)?

Signed,
Polarity Challenged

Dear Polarity Challenged:

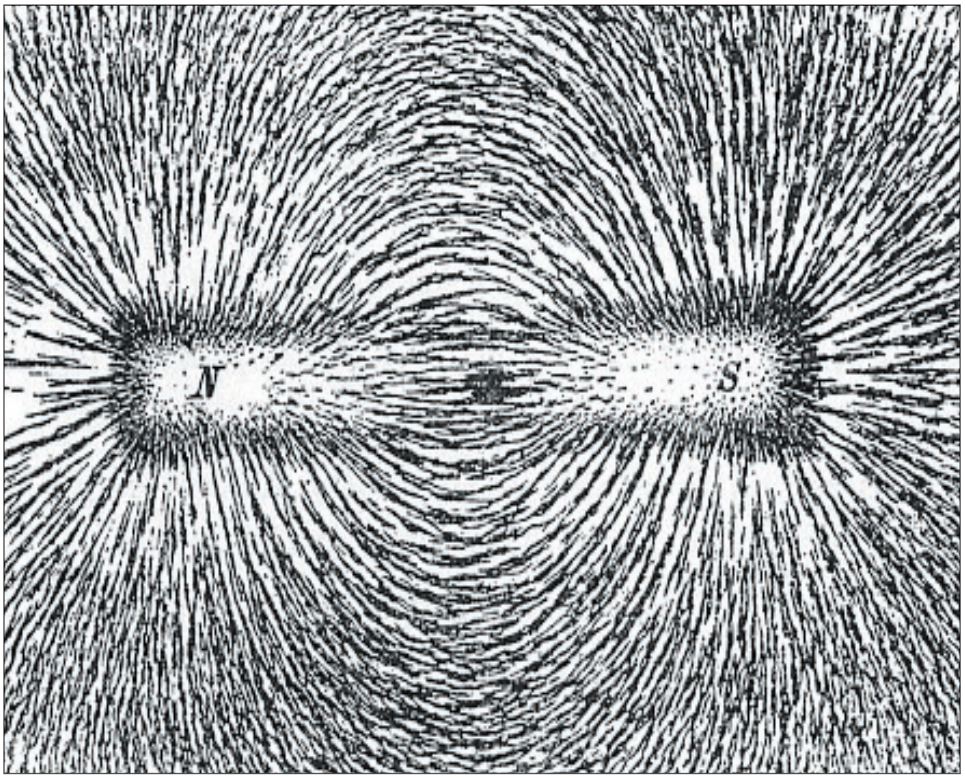
Yes, you are correct.

The refrigerator magnet is an actual magnet, but unlike the bar magnets we usually use in science classes (with a pole on each end), refrigerator magnets have poles on each large face.

The refrigerator front is made of steel (iron alloy) that is not a magnet. When you place the refrigerator magnet on the refrigerator, the magnetic field from the magnet "induces" the little atom magnets that are disorganized in the steel to temporarily align with the poles of the magnet. They, in turn, attract each other.

The same thing happens when you bring a magnet near a paper clip and it temporarily acts like a magnet and is attracted (and will attract other paper clips). Once you remove the magnet, this temporary magnetism soon disappears as the atoms randomize again. ■

Rod Ziolkowski
Physics Teacher in Residence
Department of Physics and Astronomy, CSULB
Whitney High School ABC Unified School District
K-12 Alliance Cadre member for 18 years



Understand States of Matter Through Elements of Plot: A Day in the Life of H2O

The latest "buzz" in the educational arena is "21st Century Skills" with the importance that students be adept in learning and thinking skills for future success. Yes, students need to learn the academic content, but they also need to know how to continue learning and to make effective and innovative use of what they know.

Some important thinking and learning skills for the 21st Century are: communication, collaboration and contextual learning.

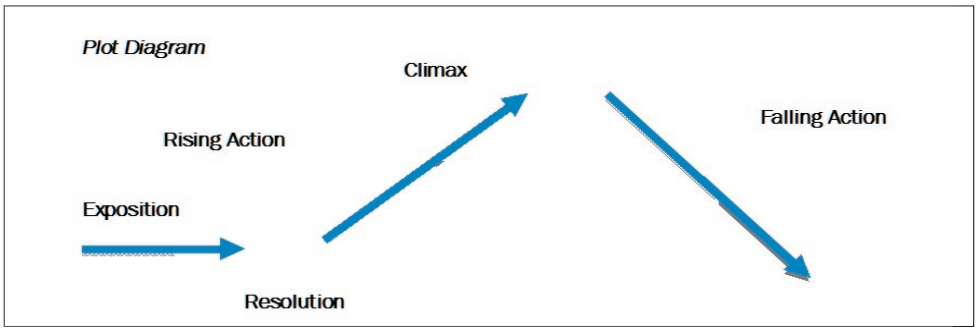
In Marysville, a CPEC grant, in partnership with University of the Pacific, is providing the Marysville JUSD middle school teachers with opportunities for their students to jump into 21st Century Skills. The grant allows the teachers to develop contextual learning experiences for their students as they work with their peers and effectively communicate their understanding.

The Marysville grant focuses on the connection between Language Arts and science. Language arts skills can certainly help students better understand science concepts; science concepts have been successfully used to develop written and oral communications skills.

The grant provides Marysville Science, ELA, ELD and Special Educations teachers collaboration time where they discuss the specifics of each content area, looking for connections that will offer students meaningful contextual learning experiences. This collaboration is vital; teachers need to deeply discuss the standards with each other and critically evaluate appropriate and possible areas of integration.

One group of eighth grade teachers wanted to see if using the components of "Plot" would help students understand the concept states of matter depend on molecular motion, and, moreover, would that understanding help the students also identify the different components of "Plot."

Here's what they did:



With pictures of a water drop, ice cube and water vapor (a cloud), the story of H_2O was plotted on the "Plot" diagram.

The resulting story:

"(Exposition) H_2O is confident as he goes off to school (solid); it is a bright and sunny Monday morning, his homework is done and he and his girlfriend had a wonderful Saturday at the park. In the car, on the way to school, his mom tells him that his homework is NOT done and his room is NOT cleaned-up. H_2O begins to get annoyed and angry; he heats up (rising action)(becomes a liquid).

H_2O arrives at school, thinking everything will be OK, but his girlfriend comes up to him and says that she really likes someone else. Now, H_2O gets really heated up, his particles are moving very fast (climax) (becomes a gas). During morning snack break, H_2O finishes his homework and begins to feel more cool and relaxed (falling action) (becomes a liquid). Then at lunch, his girlfriend apologizes and tells him that she really had a wonderful, fun time at the park and does not want to go out with anyone else. H_2O cools way down (resolution) (becomes a solid)."

While the story was being told, pictures were placed on Plot Diagram. Students then went outside and physically acted out the emotions/motions of H_2O as the story was retold.

SEE H2O, PAGE 8

LITERATURE CIRCLES (CONTINUED FROM PAGE 4)

A natural link occurs between literature circles and inquiry science; the best practices in a literature circles classroom; such as asking authentic, open-ended questions; incorporating students' words and ideas into classroom discourse; responding positively to student responses; and using students' responses to further discussions (Nystrand and Gamoran 1997); mirror those of quality science teaching. Reading and experimenting together more accurately reflects the practice of scientists. Science-based literature circles represent a win-win for teachers and students as reading generates curiosity in science and doing science promotes enthusiasm for reading.

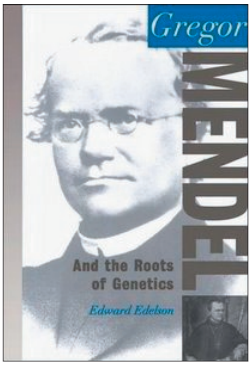
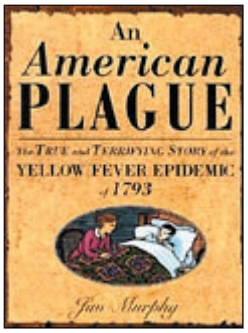


Table 1. Science texts for middle school

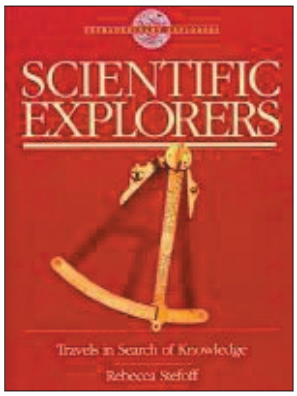
Biographies of scientists

Galileo: Astronomer and Physicist by R.S. Doak
The Wright Brothers: How They Invented the Airplane by R. Freedman
Curious Bones: Mary Anning and the Birth of Paleontology by T.W. Goodhue
Issac Newton by K. Krull
Always Inventing: A Photobiography of Alexander Graham Bell by T.L. Matthews
Something Out of Nothing: Marie Curie and Radium by C.K. McClafferty
Who Was Charles Darwin? by Deborah Hopkins from the *Who Was* series
Charles Darwin: And the Evolution Revolution by Rebecca Stefoff
Gregor Mendel: And the Roots of Genetics by Edward Edelson



Historical accounts of science

Phineas Gage: A Gruesome but True Story About Brain Science by J. Fleischman
The Planet Hunters: The Search for Other Worlds by D.B. Fradin
Fossil Feud: The Rivalry of the First American Dinosaur by T. Holmes
An American Plague: The True and Terrifying Story of the Yellow Fever Epidemic of 1793 by J. Murphy
Scientific Explorers: Travels in Search of Knowledge by R. Stefoff
Charles and Emma: The Darwins' Leap of Faith by D. Heiligman ■



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H2O (CONTINUED FROM PAGE 7)

Here is a sample of the student work (which is representative of both science classes; these classes both have high percentage ELD students):

"States of matter are solid, liquid, gas, and plasma. A solid has a definite shape and volume. The molecules vibrate because they are so close together, they can't move much. A liquid has no definite shape but does have volume. The molecules in liquids slide pass each other. A gas has no define shape or volume; they do move freely and often collide, but they mostly go straight and they bounce off objects they hit." (Note: plasma was mentioned in this lesson, but not used as a part of the story).

Upon reflection and review of student work, teachers recognized that students understood the concept that states of matter are dependent on particle motion. The ELA teachers also discovered that during Language Arts, students had a better grasp of the elements of plot in their literature reading.

This learning experience incorporated the components of 21st Century skills—it was contextual, students collaborated as they built understanding and communicated what they learned. Importantly, they were engaged and motivated to learn content. In our current drill and kill environment, this type of lesson is definitely a cool glass of water that everyone can enjoy with gusto! ■

NOTEBOOKING (CONTINUED FROM PAGE 1)

When reading the comments below, you'll notice that most teacher reflections indicate that notebooks are a place to keep organized notes for learning science, academic vocabulary or remembering. Only a very few of the "Voices From the Field" of teachers new to using notebooks included student thinking.

Year One Reflections

Joy and Wonder of Science is Evident!

- I enjoyed teaching science in the classroom. Students were always asking when and for how long. Students enjoyed science so much that they were always well- behaved.
- Students cheer when we are going to do the experiment or activity.
- I love science! Students loved discussing what they learned.
- The excitement on the students' faces and interest in learning. Students enjoyed the time allowed to interact and discuss investigations.
- When asked to pick the best experience in science the teacher exclaimed, "Tough Choice!" "Wow!" The students and I enjoyed all of our lessons; however, obviously the "hands-on" planting, observations, monitoring of the growth process was fabulous. The terrarium activity was undoubtedly the best!

Citing Links between Hands-On Experience/Oral Language/Writing

- Allowing students to share their thoughts promotes further questions and interest. Giving the students the opportunity to write and keep a journal allows them to make the experience personal.
- Verbalizing and writing helps cement the knowledge gleaned from any learning lesson and with science. It's vital to use both with pair-share and the "write from the beginning program/ strategies."
- Students have developed higher vocabulary and grown in confidence when speaking. They know what they want to write, but they may need some help putting it on paper.

Notebook Management Focus

- Student notebooks are impressive for first grade or even for a third grader. When we started our table of contents, they were lost. Now they make their entries and put the appropriate pages on the correct page.
- Science activities spurred many active discussions that fueled students' writing, which led to a full and complete science journal.
- It is a challenge keeping kids writing after the hands on activities. It helps that students know which thinking map helps them write in notebooks.

Notebooks or Talking as a Way to Remember Science or Vocabulary

- Students were very interested in the activities and this helped them remember and retain information.
- Writing in journals helps students remember science concepts.
- Talking and sharing helped students remember vocabulary.

Notebooks to Develop Understanding/Thinking

- The students used the notebook as a tool to express themselves. Students drew, wrote in complete sentences, added ideas to help them improve their understanding of science.
- Talking elicited opportunities to generate more questions and ideas, so the students were extremely metacognitive. One needed to allow plenty of time for listening and speaking.

We will continue to assist these teachers in implementing science notebooks and continue to collect and categorize their reflections for the next two years. Our hope is that teachers will move from student notebooks for recording teacher ideas to notebooks for student thinking and processing. As an experienced science teacher says: "Using notebooks is all about the student thinking."

Stay tuned to watch and discover how the simple act of jotting down ideas and questions in a notebook can open up doors to higher and more productive learning experiences!. ■

DATA (CONTINUED FROM PAGE 2)

math, leaving the arts, music, science, and social science to fight (and for the most part, lose) for a few precious minutes in the week. California's education became tarnished.

Yet, in the mid-2000's, hope arrived. Businesses wanted thinking students; parents began to question why education was only ELA and math; equity advocates recognized that EL and poor students were trapped in the curriculum of poverty. STEM education and project-based learning was on the rise. Educators are beginning to embrace the 21st Century Skills of critical thinking, problem solving and decision-making.

Throughout the 25 years, CSIN, then SPAN and SS&C and now the K-12 Alliance has held its course: meaningful, engaging science and math learning for all students taught by knowledgeable and compassionate teachers.

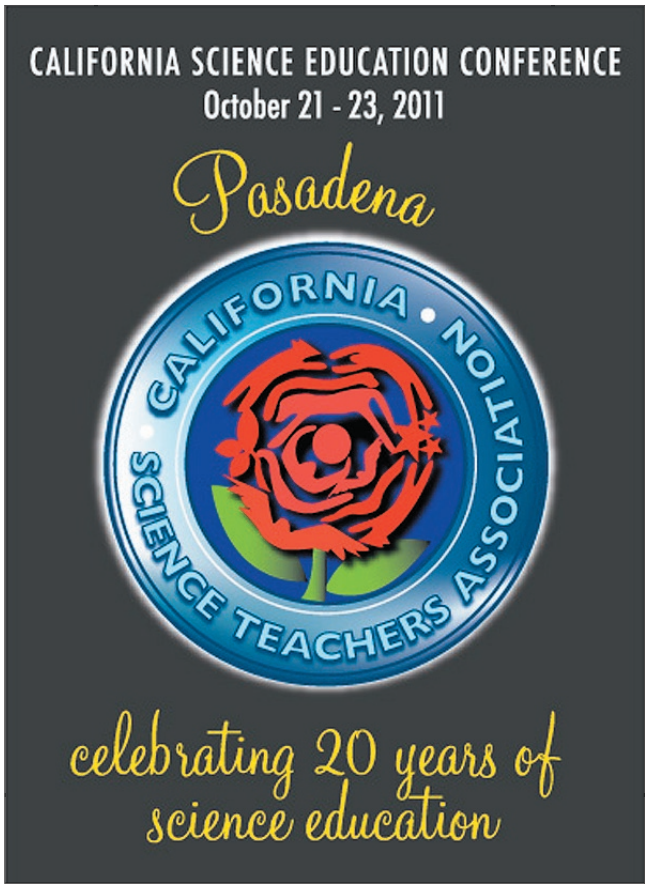
Betsy was right—we were a legend. Scott was right—good ideas never die. Doris was right—this is a whole gang o' people.

Perhaps this time the history cycle will become a trajectory of things that shape the future! We'll be there, doing what we do best! Join us for the next 25—we promise it will be the ride of your life! ■

COLLABORATION (CONTINUED FROM PAGE 5)

Within their own spheres of influence, Dean and Laura have already made a significant impact on science education in California. Together, they are going to deliver one amazing science conference that people will be talking about for years to come.

We encourage you to join us in Pasadena this October for the 2011 California Science Conference!



To register for the conference go to: www.cascience.org/csta/conf_home11.asp For the best registration rate, sign up by July 31. ■