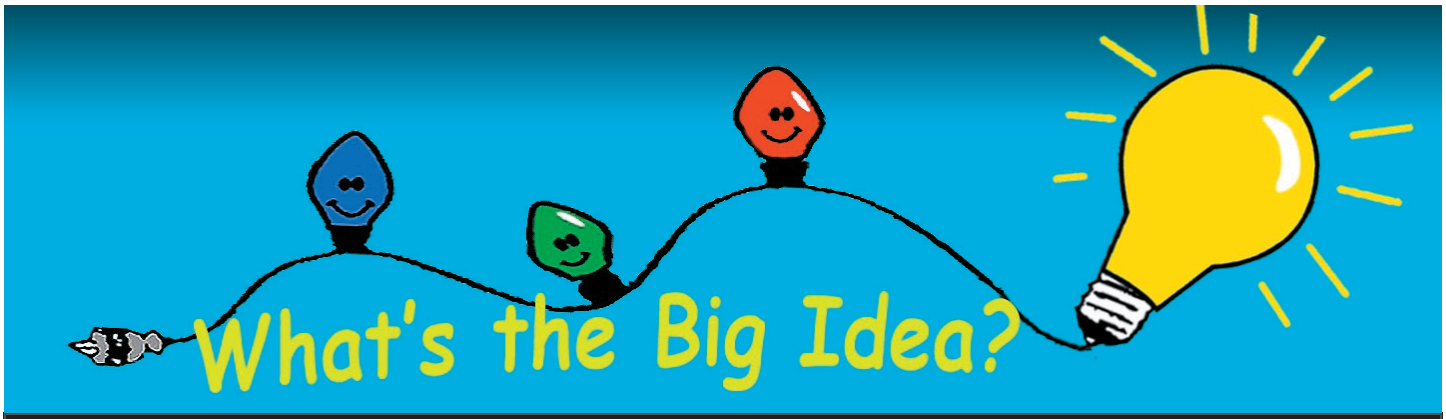

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Let's Give Them Something to Talk About!

(Editor's Note: This is first in a series of three articles about how English Language Development occurs in the highly contextualized discipline of the science classroom.)

Our work in the Montebello Unified School District with English Learners (ELs) in science was a bold experiment that had great results. With teachers, students, parents and administrators involved, an entire school and community became excited about teaching and learning science.

Funded through an ITQ/CPEC grant, this school-wide effort at Bell Gardens Elementary School (BGE) brought together long standing partners from CSU Long Beach, CSU Dominguez Hills, Cal State LA, the K-12 Alliance/WestED, the Discovery Science Center, the California Science Center, Cabrillo Marine Aquarium, and the Montebello Unified School District, which agreed to build on the previous K-2 ITQ/CPEC program that had been implemented at three other schools in the district.

Similar to the other ITQ/CPEC programs in the district, BGE's goals were to increase teacher and student content knowledge in science and to improve teachers' pedagogical content knowledge in science and English Language Development (ELD).

Few teachers at BGE taught science on a regular basis, however, all teachers taught ELD on a daily basis. Teachers knew that in order for students to move from Basic Interpersonal Communicative Skills (BICS) to Cognitive Academic Language Proficiency (CALP), they needed to provide on-going opportunities for students to talk to each other about important content.

Project leaders posed a challenging question: what success would we have with the English Language Development of students, if ELD were taught in the context of science, rather than the current ELD approach where ELD was taught in isolation absent content?

By blending ELD instruction with science, instruction project leadership teams knew that they would have to tackle both areas of the curriculum because elementary teachers are often uncertain of their own science content knowledge and their ability to implement inquiry-based instruction.

Three other schools in the district had already embarked on this path and found that science lessons gave students authentic experiences for oral language and academic vocabulary development. Preliminary data from the K-2 project indicated that students of participating teachers were making gains in oral language as compared to students in control teachers' classrooms.

IN THIS ISSUE...

Our design for professional development included science content, pedagogy and ELD instruction for the teachers during the summer institute. Each summer teachers learned science content at one of the science "informals" as part of their content experience. Ongoing professional development during the school year blended science content, pedagogy and ELD through the K-12 Alliance's Teaching Learning Collaborative (TLC).

Teachers did in-depth planning for science and ELD; students now have science and ELD on a daily basis. Parents wanted to help, too, so district leadership provided Saturday science classes for parents so they would understand how to help their children at home. With everyone involved, students were surrounded by rich science learning experiences at school and at home. BGE had figured out how to give students something to talk about!

So how did this bold experiment impact teachers and the school culture at BGE? After three years in the project, here is what one of the teacher facilitators had to say about the program and its effect on the school:

TALK, CONTINUED ON PAGE 8

DIRECTOR'S COLUMN

Feelings

By Kathy DiRanna

Twenty-five years ago, Tom Sachse, Manager of the Science Unit for the California Department of Education, walked into one of our first trainings held in the cafeteria, in a room loaded with extra "stuff." We did our best to camouflage the room's original design and had decorated every table with test tubes as flower vases. Tom was the epitome of high style and class, impeccable in speech and mannerism. He walked around the room before the teachers came, ran his hands over the butcher paper table clothes and said, "I really like the feel of this room."

Twenty-five years later, Marcia Trott, Program Director for the Post Secondary Education Commission (CPEC), came to the Tulare Summer Institute on opening day. There were decorations, prizes, warmth. Her comment: "I really like the feel of this room."

The K-12 Alliance is synonymous with hard work and a warm inviting feeling.

In this era of accountability where everything is by the numbers, it's nice to know that people outside of our organization realize the importance of the affect. They recognize how important relationships with people are; how important it is to create a safe and welcoming environment for learning, and how fundamental it is to recognize each and every person as a contributor to the greater good.

I was reminded of how important affect is at CSTA this past weekend. As usual, we had the K-12 Alliance room where our teacher leaders presented sessions. The room was packed for most of the sessions, because conference goers spread the word that "good sessions were in room 101." We had past K-12 Alliance participants stop by to say hello and reconnect with people who are important to them. We had new people who "liked the feel of the room" and wanted to know more about our programs.

So we explained.

We are known as an organization that provides quality professional development. We design programs for the reflective practitioner. Our goal is that each of us gets better at our teaching craft because we embrace continuous improvement. We spend hours talking and listening, analyzing and interpreting to find ways to improve teaching and learning.

We challenge ourselves with new learnings—how to make science and math notebooking meaningful for all students; how to teach conceptually in an era of pacing guides; how to provide authentic learning and assessment experiences that help students build knowledge and confidence to be life long learners.

We spend time developing ways to incorporate project-based learning and 21st century skills into a school day that is dominated by isolated silos of departments and short periods, or into a school day crammed with remedial language arts and mathematics.

We challenge ourselves to design lessons for learning in the TLCs. We recognize our limitations in content and pedagogy and find new ways to forward our learning. We do all of these things to help us be better teachers. But most importantly, we encourage the heart so that we can be better humans.

Let us continue to honor each of us, to embrace our collective humanity. Let us continue to build long-term relationships and celebrate that the K-12 Alliance has a feel that makes people want to be a part of the solution.

What a feeling! ■

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Open Door Opportunities Abound

By Lydia Rodriguez

I have been teaching fifth grade at Oasis Elementary since 2006, a school where 98 percent of our students are English Language Learners and 100 percent of them receive free and reduce lunch. The challenges I encounter daily are reminders why I went into teaching after working in the medical field as a nurse for 15 years. The smiles and "aha" moments the students show on their faces when they understand a problem, experiment or procedure; when they answer a question correctly makes every day memorable.

Math and Language Arts were two subjects that have been in the forefront in my school district since I started. Although my students were being tested in science every year, there seemed to be less minutes to teach it from my district along with no staff developments and no Peer Learning Communities meetings. On top of all of that, another setback for me is that my students were coming into fifth grade with minimal science knowledge and most of them did not have much experience with hands-on experiments. Many obstacles to overcome!

About two years ago, our principal asked if we the school staff would like to be part of a grant that would showcase science in our daily instruction. Because of this great fortunate opportunity, science is no longer a subject that is foreign, but a subject that has become part of our school culture.

"...science is no longer a subject that is foreign, but a subject that has become part of our school culture."

Lydia Rodriguez

I became exposed to science kits and learned what were in them. Becoming familiar with the supplies and materials that I would be working with made it less intimidating and overwhelming. I was provided with time to do experiments with my grade level. I was also given content training by teachers who love to teach science, and who have become my cheerleaders and support when I need help. This new outlook in science has truly made a difference in my very own classroom.

What seemed like the impossible has become possible. Time for science has now taken a front seat in my daily schedule. My grade level and I have set aside 40 minutes daily to science 4 days a week. We discuss experiments and what students are thinking and writing in their journals. We take our time with the different hands-on investigations. Students look forward to working in groups and discussing their ideas. Everything they are learning is from their actual experiments and reflection writing, not from reading their textbooks. We find connections to math and apply the new vocabulary they learn in their pair sharing.

Walking into my class the first thing you see is measuring spoons, balances, salt crystal results from evaporation, and journals with their own thinking and reflections. As a grade level, we also decided to mainstream our resource students with special needs in our classrooms to give them the same science opportunities.

This experience has given me a new outlook on science and how it helps our students in many ways.

A couple of months ago, I became a science lead teacher for our school site. I am responsible for our afterschool science parent involvements program, an opportunity for parents to come in one hour after school and help teach science to their own children and classmates in their primary language. It is amazing to see how much parents enjoy learning with their children. When children learn afterschool with their own parents, they begin to see practical implications and how they can use that knowledge at home while cooking, cleaning or simply walking down the park watching the rain fall.

Overall, I know I have more to learn in serving my students and community. I seize any chance to enhance my own knowledge and hope to be other teachers' cheerleader in the area of science.

For me, as a leader involves taking it one step at a time, but more than anything, I want to help teachers understand that a student's lack of the English language is not to be looked upon as a disadvantage to teach science, but rather an opportunity to become a better educator. ■

Lydia Rodriguez is a fifth grade teacher at Oasis Elementary in Oasis, California a rural area part of Coachella Valley Unified School District.

Bridging the Gap

By Melissa Smith

For the past three years, I have had the honor of working with some of the best teachers in the Lake Elsinore and Temecula Valley on a CaMSP Science Grant. That grant provided me the unique opportunity of leaving the classroom and serving as a Science Teacher on Special Assignment (TOSA) to manage the day-to-day operations associated with running such a large grant.

When the grant ended this year, I moved back into my science classroom with new ideas and a renewed sense of enthusiasm for teaching the subject I love so much. With that enthusiasm, however, came an equal amount of apprehension. Would I be able to do all of those things I had asked of teachers for the past three years? Could I use the tools I had seen by these amazing and motivating teachers to improve my own classroom and bring science alive for my students in ways I had not tried before? Basically, was I good enough?

This article, along with the ones to follow, chronicles things I have learned since stepping back into the classroom. Not all of my attempts to bridge the gap between theory and practice have been smooth ones, but what I learned (and will continue to learn) has been incredibly useful in my own development as an educator and professional developer.

One of the main things I wanted to change in my classroom was the way I approached student notebooks. While I did have the students document their classroom experiences (labs and classwork) in their science notebook, I did not spend much time asking them to reflect on what they had learned, or make connections between past and present experiences. On top of that, I did not ask for much of my students in the way of "metacognition" – which ties together their learning experiences.

I created three goals for my students' notebooks:

(1) Encourage students to make their science notebook "their own.
(2) Help students make connections between the activities and lessons throughout the school year.
(3) Guide students to have a better understanding of what helps them learn.

In order to accomplish these goals, I decided to change the way I normally handled science notebooks by relinquishing some of my control over the notebooks and giving that control to my students. Believe me, this was the hardest part!

I gave each lab group a supply basket filled with sticky tabs, glue sticks, scissors, highlighters, red, blue and black pens, a giant eraser, and a pencil sharpener. My theory was that if the students had the supplies they needed to organize their notebook, they were more likely to do so.

In addition, I incorporated "metacognitive moments" at the end of every lesson, and I purposely set up situations where the students' ideas were incomplete or incorrect, then, as they learned more about the topic, I asked them to go back and make changes (in a different color pen) to their original ideas if they thought they had more to add or modify.

My final change was to collect a different class periods notebooks each week so that I could take the time to make comments (not grades) throughout each book. On Monday, it was fun to see them dig through their notebooks to see what comments I had given them. For me, I got to know each student's strengths and weaknesses so much better.

The result? Well, the year is still young, but my most exciting observation is the ownership students are now taking with their notebooks. Simple things like asking them to organize their notebook has resulted in some of my lowest and most disorganized students voluntarily coming in at break and lunch to create a brand new notebook because they felt theirs wasn't organized enough.

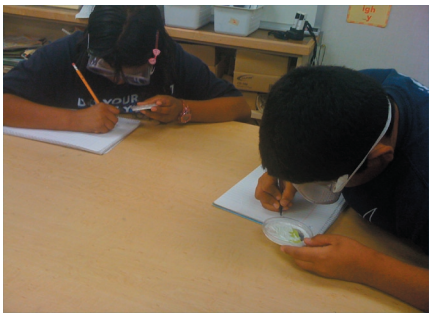
GAP, CONTINUED ON PAGE 8

Expanding Partnerships and Collaboartions

Providing more science opportunities and how notebooking relates to student learning is part of a new CPEC collaborative project in the Coachella Valley Unified School District.

Science Drives Literacy (SDL) is a new grant that builds on previous work with the same partners from the Science Writing Impacts Real Learning (SWIRL) project, funded in 2010. Partners include California University San Bernardino, Coachella Valley Unified School District and the K-12 Alliance. The synergy developed by these long-term partners made the SDL grant an application of lessons learned in the SWIRL project. Which lessons? Mainly, how to instruct the use of notebooks to develop literacy skills for English Language Learners (ELLs) and integrating the California Common Core Standards for ELA.

The four schools targeted by SDL include student populations with over 75 percent ELLs who have received little or no hands-on science due to persistent mathematics and language arts gaps. SDL's developers have the foundational premise that language development for ELLs must include both experiences with academic content (such as science) and appropriate realia used in the "doing" of science. Science experiences provide the "raw" material for thinking and meaning making in science notebooks. Writing and oral language development standards in the California Common Core ELA will be used to focus work in notebooks



Both projects share common goals of writing in science and will benefit from lessons learned in the collaborations. Commonalities include: using FOSS materials, notebooks, and parent/student programs in each project. Each project has unique strategies for each of the common threads.

Initiated last January, the SWIRL grant has achieved the goal of all students using science notebooks on a regular basis. The parent/student program began this fall includes all first graders staying after school doing science with parent or teacher lead small groups. The goal for the after school is to increase "family talk" using academic language. All primary grade students (K,1,2) receive one month of parent/student programs focused on a FOSS unit.

Early results from the SWIRL grant indicate that all teachers are teaching science using notebooks! Both students and teachers are proud of the work and talk with pride about the science focus at the school.

The new SDL grant will kick off its kit training and notebook sessions in December 2011 and support teachers' work with kits and writing through lesson studies through out this school year. The afterschool program for the new grant establishes science clubs for students as well as a family science event. In addition, an intensive summer content institute will focus on California Common Core standards for ELA and science content next summer.

Both SDL and SWIRL build on the idea that science is a key to academic language and opportunities for ELLers. Each effort focuses on the parents as part of the equation for building academic language and supporting science at schools. Curriculum for high need language learners must provide the richness of content and the beginning of life-long learners of science.

Overall the "bare bones" curriculum of poverty described as a curriculum focused only on mathematics and language arts is no longer true at the SWIRL school or the four SDL schools. Content in the academic area of science is not only "nice" but "necessary" for access to a future in areas of science, technology, engineering and mathematics. ■

Science Notebook Conclave

"It was a wonderful day, full of collaboration and hard work. We answered five big questions and wrote position statements by the end of the day to express why notebooks are the 'thing' to use for maximizing student learning. I came up with several on the spot new ideas that I immediately used when I returned to the classroom yesterday. The ideas generated tons of conversation in my classroom among students. It was so exciting!" sums up Terrie Perez eighth grade teacher from San Diego's IDEAS project about her recent participation in the California Science Notebook Conclave.

Held in Davis, California, the Conclave's promoted productive dialogue about the classroom use of science notebooks and produced documentation for a statewide study on science notebook use in California.

Sponsored by the Postsecondary Education Commission (CPEC) and led by Arthur Beauchamp of the Sacramento Science Project, the Conclave brought together 24 teachers who are experienced users of science notebooks.

The K-12 Alliance recommended about half of the participants. Here are some of their comments and thoughts about the Conclave:

It was a really great, productive day (and I don't say that often). Arthur had amazing pacing and ability to get us to interact. We spent the majority of the day answering key questions- How science notebooks are useful, how to gain more support to use them, best practices within notebooks and how they address the needs of elementary, secondary and ELD kids as well as teachers. The whole group was really dynamic. And they were really impressed with the science notebook samples from EARTHS.

--- **Kathryn People, second grade teacher, EARTHS**

The notebook conclave was very worthwhile....a really great productive dialogue with a group of teachers who get what science notebooks are all about...

One of the questions asked was "What obstacles or issues are keeping more teachers from using notebooks?" Lack of knowledge or training was listed as one of the biggest reasons. It made me very grateful for all the training I have received from K-12, and also very motivated to find ways to keep the staff development going in CVUSD.

--- **Jana Gentry, fourth grade teacher, CVUSD**

Got great new ideas about elements to add to our notebooks It was nice to see that our notebook activities were on par with those throughout the state. It is also wonderful to realize how unique EARTHS is and how blessed we are to be able to teach the way we do.

--- **Jennifer Moore, fourth grade teacher, EARTHS**

The day was productive in that there was a tacit understanding that everyone present supported the inclusion of notebooks in science curriculum. Much of it was aimed at identifying best practices in their use. Structure didn't take center stage (probably only a third of the group used the AVID model), but "claims and evidence" did (that's a biggie). Some sharing of notebooking ideas took place (types of prompts and structures for note-taking), but it was apparent that most of the people present had committed to the idea of using notebooks without extensive training themselves. That freedom to make [that practice] fit their own teaching styles seemed critical to success.

--- **Janet Zierenberg, eight grade teacher, Big Oak Flat Groveland USD**

A report of the Conclave will be out in the spring at which time we will provide information on how to access it.

In the meantime, keep notebooking....!

Ask a Google - A Cadre Stand-In

At a recent Teaching Learning Collaborative (TLC), the team was discussing physical and chemical changes and the terms “endothermic” and “exothermic” came up in the discussion. Most of the group recognized endo as “in” and exo as “out” and all knew that thermic had to do with heat. Part of the group thought these terms only applied to chemical reactions; others thought they applied to both physical and chemical changes.

Cadre to the rescue! ...But not in the normal sense. We tried getting several of our professor buddies on the phone, but to no avail. So we decided to use the Internet instead.

We learned lots of things. While looking for physical and chemical changes, some group members were amazed to find that popping corn was considered a physical change but that frying an egg was chemical. The teachers had been using the simplified rationale: “In a chemical change you can’t get back what you started with.” While this rationale is convenient, it also leads to misconceptions. Neither the popcorn nor the cooked egg can go back to its original components. In the case of corn, popping just changes its shape—it is still corn. In the case of the cooked egg, the protein is denatured and a new substance is created!

Wow, learning at every corner! But back to our original question: when to use those endothermic and exothermic terms?

Most of what we found described exothermic reactions as those that “release energy in the form of heat.” Exothermic reactions may occur spontaneously, they produce heat or may even be explosive.

Endothermic reactions must absorb energy in order to proceed. Endothermic reactions cannot occur spontaneously. Work must be done in order to get these reactions to occur. When endothermic reactions absorb energy, a temperature drop is measured during the reaction.

And we learned that when trying to classify a reaction as exothermic or endothermic, one should watch how the temperature of the surroundings changes. An exothermic process releases heat, and causes the temperature of the immediate surroundings to rise. An endothermic process absorbs heat and cools the surroundings.

Ok—good to go on using these terms in a reaction—but what about a physical change, not a chemical reaction? Here’s where we found an “escape clause:” When you talk about physical changes as a process, you can apply the word endothermic or exothermic to that process.

Thus, physical changes such as making ice cubes, forming snow in clouds, or condensing rain from water vapor are exothermic processes. But physical changes including melting ice cubes, converting frost to water vapor and evaporating water are endothermic processes

The bottom line: when heat is given off, it’s exothermic. When it’s absorbed, it’s endothermic. How’s that for something hot and cool! ■

The Proof is in the Score

Minnie Cannon Elementary School recently participated in the Lake Science Collaborative, a partnership among the K-12 Alliance, Sonoma State and several districts in Lake County. Three teachers from the school came to the trainings and took their learning about science content and pedagogy back to share with their colleagues.

This year, principal Everett Brooks shared an interesting API report that just makes our day.

In general, students at the school improved by 31 points, with improvements at each level. Great news, of course, but the most exciting findings were in science. Science had the highest increases across the analysis spectrum, with most students going from 'basic' to 'proficient.' In 2009-10, basic competency was at 54 percent with 21 percent at the proficient level. For 2010-11, the proficient level increased to approximately 61 percent of student with approximately 13 percent at the basic level.

Good news, indeed!

Teachers claim that this success is a direct result from their participation in the Ca MSP program that was spearheaded by Olga Clymire. And we couldn't be more pleased!

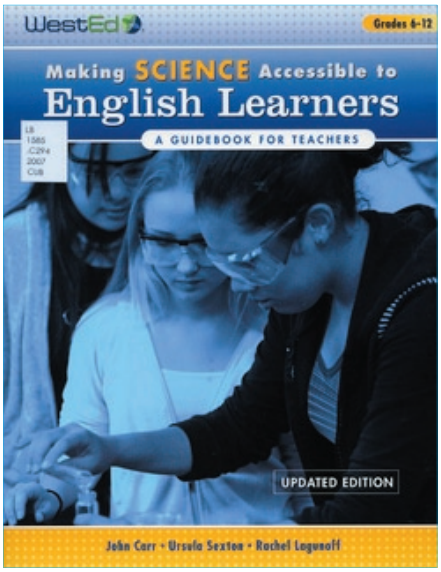
Kudos to all! ■

TALK, CONTINUED FROM PAGE 1

This has been the best thing that has happened to our school. Teachers, parents and kids are getting more science knowledge. Grade level meetings have changed. Science is great. The funding for this project was used in the wisest and most efficient manner. Not only have teachers benefited, but students have truly benefited from this program. It has allowed teachers to grow and display the excitement and energy that transfers to kids, to parents, and the community. The mayor even attended our science fair! If there is another opportunity keep our school in mind.

Science is the perfect forum-everyone is engaged in science, we are all equals and are amazed when kids have the command of the language. They are not perfect, but they are getting there. Thanks to CPEC for allowing us to be a part of the project!

How does this happen at a school? Project leadership consulted many resources and experts to plan professional development for the teachers at BGE but leaned heavily on *Making Science Accessible to English Learners* by John Carr, Ursula Sexton and Rachel Lagunoff. This guidebook for teachers addresses how people learn, the 5E learning sequence, and sound thinking for designers of professional development.



The following three ideas guided our professional development choices:

"Teachers should not assume that a student's everyday fluency in English is a sign of equal proficiency in understanding English for academic purposes. Teachers need to decide when to focus on language form correction versus when to focus on content material comprehension. Teachers can make academic content more accessible by: accessing students prior knowledge, providing context clues, hands-on activities, and interactive learning experiences, using realia, pictures, graphic organizers, and sentence frames" (Carr, Sexton & Lagunoff, pp. 26-28).

In the next two articles, we will expand on how we brought these ideas to reality at BGE. ■

GAP, CONTINUED FROM PAGE 4

I now have students not only tabbing their science notebook, but also all of their other notebooks and agendas. It is gratifying to see my students taking the time to set up their notebook and take ownership of their own learning. While there is still much to learn, my kiddos are well on their way to becoming top-notch scientists!

Stay tuned for more updates! ■

Melissa Smith is a LEUSD Science Program Director and teaches at Canyon Lake Middle School in Lake Elsinore.