What's The Big Idea?

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Student-Driven Sense-Making Notebooks

Editor's note: This article is fifth and last in a series on sense-making notebooks. We have progressed through key topics on how teachers can use notebooks to promote student learning. For students, notebooks are a place where they 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.

Thus, a student notebook is an important instructional tool, which can be used to design targeted interventions. In this article, we discuss the difference between a teacher-directed and a student- driven notebook and how scaffolds support self-directed student learning.

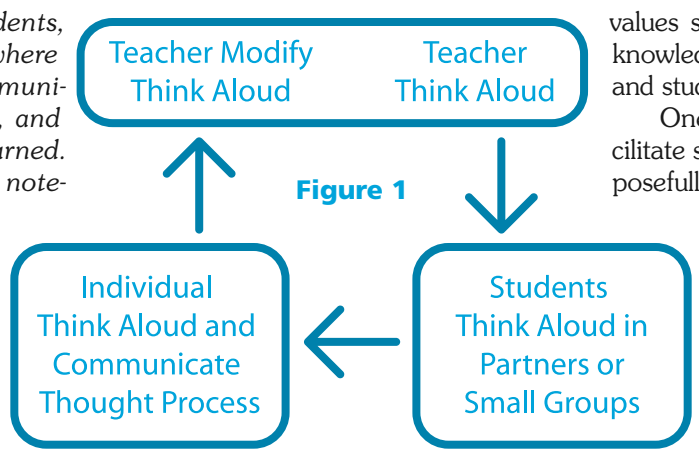


Figure 1

Developing Independent Student Thinking

Children enter this world, not as empty vessels to be filled, but with a brain capable of complex understanding and new discoveries. Our job as teachers is to find ways to reach children, facilitate their understanding by developing schema, and help them make connections between important ideas. As Robert Frost wrote, "I am not a teacher, but an awakener."

We know that student learning is greatly enhanced when students are empowered to make decisions related to how they connect new content to what they already know, organize their thoughts, and communicate their understanding of newly acquired concepts. We also know that students need assistance in developing skills to help them become self-directed learners.

The culture of the classroom can be a rich environment to stimulate this type of learning, particularly when teachers view their role as facilitator/awakener and establish a milieu that values shared experience and knowledge of both the teacher and students.

One way to do this is to facilitate student learning by purposefully designing scaffolds for students to develop metacognitive and communication skills. The ultimate test of an individual's knowledge is whether or not they can transform ideas into their own thoughts and words, and then communicate those ideas within a larger forum – in our case, a classroom. As John Locke reminds us, "Reading furnishes the mind only with the materials of knowledge…It is thinking that makes what we read ours."

In construction, a scaffold is a temporary framework that supports workers and materials during the erection of a building until it can stand alone. Likewise, in education, a scaffold is a supporting framework that helps learners become independent thinkers.

In the late 1990s, the K-12 Alliance developed a "generic" scaffold that has been used successfully with students in diverse settings. The scaffold is represented by a triangle of "think alouds" that corresponds to the thoughts of the teacher, student with peer support, and individual student, followed by a written or oral account of the student's thought process. Inevitably, the student's new way of communicating his/her conceptual understanding will influence the teacher's own thinking. (See Figure 1, above.)

The basic idea is that students need models of "thinking." Learners benefit from having the teacher walk them through how one might problem solve. Then, students along with their peers, practice mimicking the teacher's "thought image" with scaffolds such as prompts, sentence frames, recording sheets, criteria charts, pre-writing brainstorms, etc.

Once small groups of students can produce a verbal/written account of their thinking, then it is safe to ask individual students to reveal their thinking orally or in writing. After whole class discussions, students' thinking is refined, and eventually the scaffold can be removed.

Developing Self-Directed Learners in Science

In science, students need to acquire the knowledge of concepts and theories, as well as the skills necessary to generate new scientific knowledge. The ways scientists notice things, figure out concepts and try to explain them constitute the processes of science. These processes are sometimes called "skills for developing inquiry" because they are the means of finding out about the world.

The use of science processes in science instruction underscores the idea that students of all ages learn best when they experience things themselves, and have time to think about those experiences as well as talk about what they have seen and done. Thus, it is important to understand how to scaffold the acquisition of science process skills.

Let's consider the skill of observation, perhaps the most fundamental scientific skill. This skill is eloquently captured in the California Science Framework: "Sometimes when we observe, we do not see very much. If we do not know how to look, we will not see anything of importance. Knowledge from prior observations enables us to extract more useful information from a new situation." (CDE, 1990, p. 145)

The progression of transferring ownership of learning from teacher to student was the foundation for our matrix, Developing Observation Skills in Self-Directed Learners (see Table 1). We illustrate how one might design scaffolds for quality observations (as defined by the criteria aligned with the National Science Education Standards) that move along a continuum from teacher directed-learning to student self-directed learning.

In Table 1, teacher-directed learning diminishes as one move across and to the right (Column A to D). The first column describes teacher-centered learning, where students follow instructions without thinking about their own learning process (Column A). In the second and third column, a series of scaffolds are put in place to support student ownership of his/her own

NOTEBOOKS, CONTINUED ON PAGE 2

Table 1: Developing Observation Skills in Self-Directed Learners

CRITERIA	TEACHER-DRIVEN LEARNING——SCAFFOLDS TO——STUDENT-DRIVEN LEARNING			
	Column A	Column B	Column C	Column D
1. Uses qualitative characteristics with as many senses as appropriate.	Teacher leads a discussion to introduce the class to pre-determined criteria (e.g., use 5 senses; make multiple entries; use appropriate tools to extend senses). Criteria are posted for reference. Teacher provides a pre-formatted recording sheet.	Teacher models thinking process for observations using the posted criteria and a "think aloud" activity. Teacher completes a section of the pre-formatted worksheet and asks small groups of students to complete the rest.	Students work in partners to select a pre-formatted worksheet or one of their own designs to record their observations. Students use a "think aloud" activity to complete their observations. Students check their observations against the posted criteria.	Students write their own qualitative observation using as many senses as appropriate and use tools to extend observations as appropriate, (e.g., hand lens, microscope, and telescope). Students design their own recording format. Students may use posted criteria as a reference if they have not yet internalized the criteria.
2. Uses appropriate tools to make quantitative measurements.	Teacher leads a discussion to introduce the class to pre-determined criteria (e.g., standard and non-standard measurement; use of know scales such as hardness and pH) quantitative observations. Criteria are posted for reference. Teacher provides a pre-formatted recording sheet.	Teacher models thinking process for quantitative observations referring to posted criteria. Teacher selects tools and/or scales, and recording sheet for quantitative observations. Teacher completes a section of the pre-formatted worksheet and asks small groups of students to complete the rest.	Students work in partners to select a pre-formatted worksheet or one of their own designs to record their observations. Students use a "think aloud" activity to complete their observations. They select appropriate measurement tools and/or scales. Students check their observations against the posted criteria.	Students write their own quantitative observations selecting and use appropriate tools or scales (e.g., scale, meter sticks, thermometers). Students design their own recording format. Students may use posted criteria as a reference if they have not yet internalized the criteria.
3. Based on fact, not inference.	Teacher leads a discussion to introduce the class to the difference between observation and inference. Teacher adds criteria to the original chart.	Teacher models how to use the criteria to determine if the statement is an observation or inference.	Students work in partners to check their observations against the posted criteria and to clarify if they have recorded an inference rather than observation.	Students write their own observations free of inference.

IN THIS ISSUE...

DIRECTOR'S COLUMN

Hoping for Blossoms

BY KATHY DIRANNA

It's raining outside and I have time to be a practical philosopher. I look out at my garden and wonder if the bulbs I planted will blossom this spring. I wonder if the roses will come back from their "cut back in January" shape. I wonder if, in the end, what we do in the garden matters when nature will just normally take her course.

Similarly, I often wonder if our actions in education matter at all. Do we really help students become lifelong learners? Do we provide professional development experiences that enable teachers to become better at their practice?

Students move through the grades; teachers are often with us in in-services for only a limited time. Do we have any real impact in these short time frames? What is the end result of all this work we do??!

Because most of us remember a teacher or two that helped shape us, I know teachers can and do make a difference in the lives of their students. But what about professional development providers? What affect do and can we have?

I was pleasantly surprised to find an email last week that reaffirms what we do.

Good afternoon,

I am pursuing my doctoral degree in curriculum and instruction, and in one of my "textbooks" it mentioned CSIN, and in another chapter it quoted a "K.DiRanna".

I had to look you up, because as a novice teacher with Apple Valley USD, I attended CSIN (in Irvine, CA) for a week, and we all collaborated on formulating what the "Big Ideas" in science should be, and how these ideas would flow through the grade bands – with each grade band contributing to the story.

I used the materials the entire time I lived in California, and took my three 1/2" disks with me to Texas, as well as the units. I used the units as a basis for my science as I taught fifth grade.

When I attended the LASER Institute at the Smithsonian, I took along a few notes from the instructional materials to share with other teachers as we developed instructional materials based on national standards.

I progressed from teaching in the classroom, to working as a science coordinator at a district, to now working at a regional science center in the area of elementary science. I also write science curriculum and instructional materials for teachers who teach grades K-2.

It was great to see you are still promoting excellence in science education.

Just wanted to say "thanks" for a great start when I was a first year teacher. The methods and ideas stuck with me.

Regards,
Annette Venegas, M.Ed.
Educational Science Specialist
Instructional Programs & Services
Education Service Center, Region 20

San Antonio, TX

The email made more than my day – it was like a whole field of tulips opening up in the bright sun. Something we did in professional development helped a teacher discover a new way of thinking and a new way of teaching. In turn, she was able to "spread the news" to others. The bulbs we planted back then multiplied exponentially and the result today is blooms all around and in places we least expect it.

Finally, the rain has stopped and the sun is now shining. I go outside and scan the ground – I see small sprouts breaking through the cold soil; tiny green buds hungry for more sun. For us gardeners, nothing beats the feeling of seeing success growing where you planted something only a while ago.

Likewise, for us in the professional development world.

Here's to many blossoms of great teachers who strive daily to develop their students into thinkers with a never-ending love for learning. Here's to those teachers who put time, effort and talent to becoming the best that they can be. And here's to the professional development staff that keeps their eyes forward to the future of education.

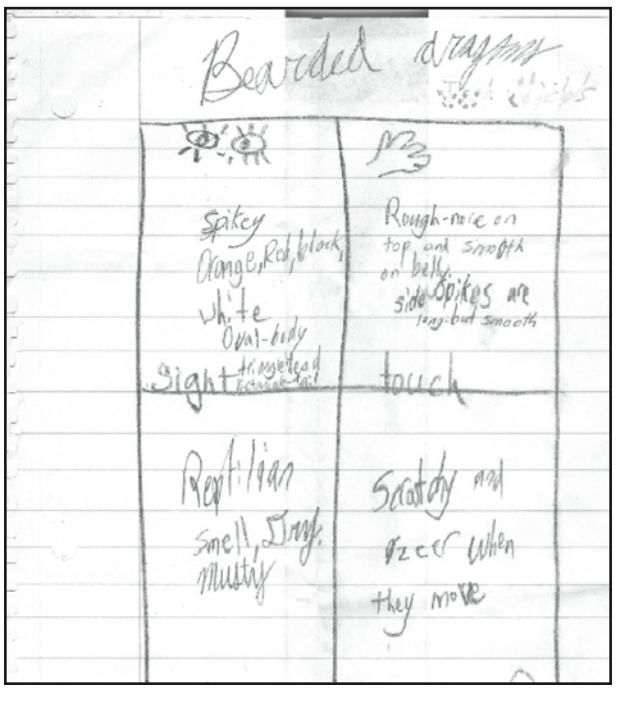
NOTEBOOKS, CONTINUED FROM PAGE 1

learning through increased student decision-making and student-to-student interactions (Column B and C). In the last and final column, scaffolds are removed and responsibility for learning is shifted to the individual students.

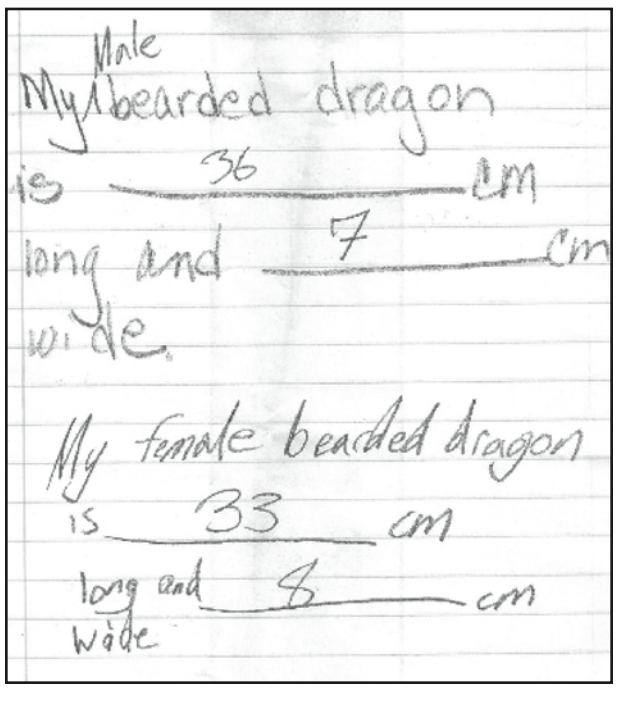
Examples from student work help to illustrate the continuum of the matrix. In Sample A, the teacher modeled how to complete a pre-formatted recording sheet. She drew the four quadrants, thought aloud about the senses, and decided to record observations for all but taste. She then drew pictures to remind her of what each sense was. She added the first

NOTEBOOKS, CONTINUED ON PAGE 4

Sample A



Sample B



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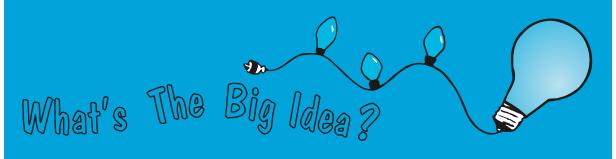

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LEADERSHIP

A Good Story, Well Told

BY DANA HAYES

Dana Hayes

As a fifth grade teacher, I decided to become part of the K-12 Alliance, not because I was a science buff, but rather, I was quite the opposite. I never considered myself "good" at science and so, as a teacher, I thought joining the Alliance would be a great way to learn more about science and become more excited about teaching it.

As a kid, I thought science was interesting, but it never really sparked my interest. Sure, I loved doing the experiments; I just had a hard time connecting them to all the "big" scientific words and what they meant. It was time to change that way of thinking.

At first, the science part was difficult because I was a little timid and I didn't have all the "background" knowledge the other teachers had. I worked hard to learn the different concepts, and the K-12 Alliance staff was very supportive. As my knowledge of science grew, so did my confidence.

But the K-12 Alliance turned out to be more than just science; it was a whole new way of looking at lesson planning as well. I discovered that the best lessons were the ones that tell a complete story from beginning to end; teaching big, board concepts this way make sense to students.

My fifth grade colleagues delegated me with teaching the hardest unit, fifth grade Matter. Before when I taught science, I followed the textbook timelines, but now, I decided to create a unit for Matter that would help students in their learning process. I thought, "How can I teach Matter to students by telling a story?" It took some time to create a timeline for my Matter unit – which included all the state standards – but I did it.

As of today, I have taught this Matter unit on three separate occasions. The results? Very successful. Of course, I am always thinking how I can improve on it, but that is what we learn in the K-12 Alliance. There are always new questions that come up and need to be answered.

The K-12 Alliance affected my teaching across the board. As a fifth grade teacher, I teach all subjects, so learning how to effectively plan a lesson has helped throughout my curriculum.

For example, when we received a new math textbook, we were given a new timeline for teaching various math concepts. The first year was rough, so, over the summer I thought how I could incorporate the K-12 Alliance techniques to teach math by "telling a story."

After creating the units, I saw that my story had good results; students could grasp the concepts and there was a better path to follow that made more sense than textbook timelines. Naturally, I mapped out all the other trimesters and shared with my fellow colleagues. They too, were very excited to use the new guidelines!

Now, every time I think about creating a lesson, I think about being a storyteller. This way of lesson planning makes me excited about creating new lessons. Not only does it help my students, but it also helps me look at material and concepts differently.

Today, I have a feeling of great accomplishments when I teach a lesson. I know I am getting my point across and that my students are really absorbing the lessons. It's no secret: I am a better teacher because of the K-12 Alliance.

I try to incorporate science into different areas of the fifth grade curriculum. Students get to do many "hands on" experiments, as well as explore science

A GOOD STORY, CONTINUED ON PAGE 4

TEACHING & LEARNING

From Speech to Paper

BY JO TOPPS

What do rocks, a double-bubble map and 20 second graders have in common? Hint: it's a two-part answer that is blazing educational trails in Southern California classrooms.

Teachers at Rosewood Park School (RPS) in the Montebello Unified School District are completing the third year of a unique approach to teaching English Language Development (ELD) during science instruction.

Funded through a CPEC/ITQ grant, this endeavor has enabled primary teachers at RPS to develop science lessons that are both inquiry-based and tailored to the language development needs of their students. Teachers at RPS have used the K-12 Alliance's Teaching Learning Collaborative (TLC) process to not only design science lessons in a 5E format, but to also analyze the effectiveness of their lessons by looking at student work and then revising lessons based on that evidence. The results: surprises and successes!

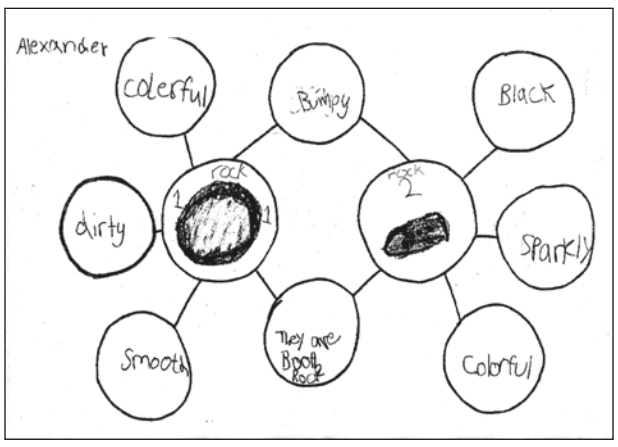
A year ago, the second grade RPS TLC team of Salvador Sarmiento, Roberta Melendez, Rebecca Traches, and Lupe Ricca developed an Earth science lesson that helped students learn how to compare the physical properties of different rocks. Their design lesson attempt focused on the mechanics of the 5E, managing the hands-on materials and paying attention to the oral language of their students.

The team created sentence frames aligned with science thinking processes, language functions and their students' English language proficiency. By the third year the team was confident their students were ready to write in science.

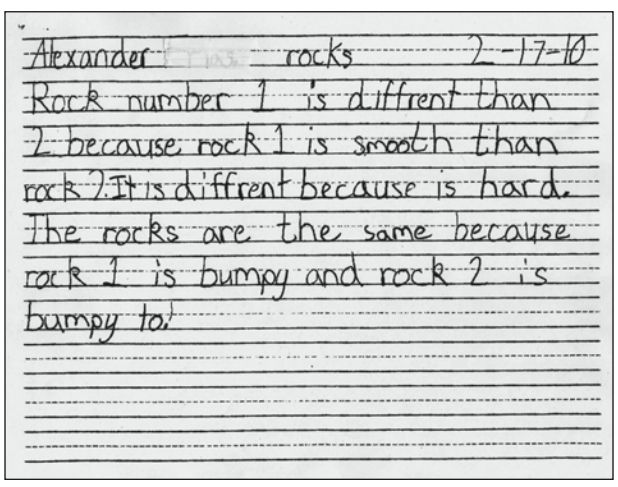
Working together, the team redesigned their lesson on comparing the physical properties of rocks. The 5E and predicting students' oral language had become a regular way of thinking about planning *any* curriculum. Materials management was now a breeze. Predicting the oral language forms students would use

FROM SPEECH TO PAPER, CONTINUED ON PAGE 4

Student Work 1



Student Work 2



COLLABORATION

Why Relationships Matter

BY JODY SHERRIFF

Oh, you never know the places you might go… and who you may be working with!

People come in and out of lives; and some times they come back into your life.

So it is with the newly funded University of the Pacific/Marysville CPEC grant.

Many years ago in the early 90's when I first started attending CSIN (as it was called then), I had the delightful opportunity to meet David Pummill from Marysville. My first summer as a Staff Developer, David was my mentor and I was his "shadow." I had no idea what that meant at the time, but I eagerly followed him around and watched intensely during his presentations. Years later, David called and we collaborated for a CAMSP grant which was so successful that we wanted to continue the work we started.

During the late 90's, Dr. Greg Potter from University of the Pacific joined our cadre teams to teach science content to teachers at the K-12 Summer Institutes. We loved his energy and teaching style; he understood the needs of teachers and firmly believes in inquiry learning.

Flash forward to CSTA 2008. Greg drops by the K-12 Alliance room to say "Hi" and says he would like to work on cadre again. Knowing his talented work as a cadre member, and knowing Marysville was eager to continue with science professional development, I was determined to find a way to bring this group together.

Meanwhile, through another collaborative effort with the Strategic Literacy Initiative, the K-12 Alliance coordinated a project in the Central Valley called Literacy in Science Academy (LISA). Funded by the Walter S. Johnson Foundation, this project used the Reading Apprenticeship strategies to promote the learning of science content. Cyndy Greenleaf from SLI provided guidance for this work. LISA was very successful at assisting diverse students reach their potential in science and literacy content and skills.

When the CPEC RFAs came out, it was an opportune time to bring together old friends to work on a new and interesting program. David Pummill, Greg Potter and I, consulting with Cyndy Greeleaf, put our heads together to design a middle school program for teachers: "Reading and Writing Equals Science Success."

CPEC liked our ideas and funded the program. In this new grant we will bring together science teachers, Language Arts teachers, Special Education teachers and ELD teachers for a coordinated professional development program that helps teachers use reading and writing as a means to promote the learning of science as well as using science content as a means to promote reading, writing and language skills.

The metacognitive strategies from the Reading Apprenticeship and the learnings from LISA also will be implemented in this new program.

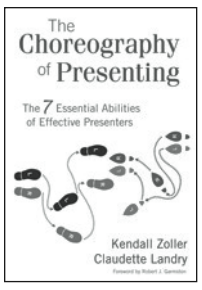
Our pasts have crossed, we went our separate ways for awhile, but we are now reconvening to begin work on this new project. Who knows where this may lead us in the future? But this I do know: collaborations and grants come and go, but friends and relationships remain connected – and they continue to encourage us to keep up the good work, move forward and always have your eyes open for new possibilities! ■

Book Review

The Choreography of Presenting: 7 Essential Abilities of Effective Presenters

By Kendall Zoller and Claudette Landry

BY KATHY DIRANNA



I was very excited when I received my copy of *The Choreography of Presenting: 7 Essential Abilities of Effective Presenters* by Kendall Zoller and Claudette Landry. I read the book and eventually used the strategies with groups with great success!

In a nutshell, this book is a must have for anyone whose job includes presenting for peers, colleagues or any audience delivering professional development workshops, trainings and presentations. Zoller and Landry describe complex communication patterns and group reactions with a straightforward simplicity and eloquence that makes it understandable and doable.

I found the framework of the 7 Essential Abilities extends and deepens Goleman's model of Social Intelligence by providing specific verbal and nonverbal patterns that engage the brain and support our social awareness and synchronicity.

Through the process by revealing and clearly explaining the choreography that is common to all effective presenters. The book begins with an overview of the 7 Essential Abilities then, each chapter provides the research supporting that *ability* as well as detailed descriptions of several verbal and nonverbal patterns. The skills are brought to life with delightful and relevant stories from real-life experiences to illustrate their powerful influences on participant learning. Also included are exercises to help readers perfect the skills.

In the chapter on Credibility, the authors share stories of presenters who have credibility as well as those who had it and suddenly lost it. The authors wittingly explain that they do "not to suggest that credibility will be established by simply implementing specific nonverbal patterns without having any actual expertise in a discipline."

Outstanding presentations require both content expertise as well as expertise in these seven abilities. Having both will significantly improve your game.

Kendall and Claudette tell us there is no magic to being an effective presenter; rather it is a weaving of your content expertise in an academic discipline with the conscious, deliberate, and systematic use of the patterns described in this book "that increase congruence between your intentions and audience perceptions."

This book teaches how to ameliorate the craft of presenting. I've seen Kendall present this work for more than 15 years and each time I learn something new or see a way to be more flexible and expansive with skills I already have. The same is true as I read this book.

Novice or master presenter will both find skills in this book that will bring enlightenment and an even higher level of expertise. Whether it is learning how to expand your RIFF to reach diverse audiences, broaden your perceptual acuity to see patterns you have always looked at but never recognized, or recover when things go awry, this book will satisfy your hunger for improvement.

Once you have read *The Choreography of Presenting: 7 Essential Abilities of Effective Presenters*, you will forever change the way you look at other presenters, and forever change the way you deliver presentations! ■

NOTEBOOKS..., CONTINUED FROM PAGE 2

observation for each sense, and then asked the students working in small groups to create the rest.

In Sample B, the teacher modeled, using a sentence frame to complete the first quantitative observation. The student group completed the second sentence frame on their own.

In Sample C an individual student was asked to make observations. This student chose to use the "quadrant" format presented by the teacher and the posted criteria to make his observations. In work Sample D, the student chose to record his observations as a "running paragraph" of what he was noticing, incorporating the criteria for quality observations. Each of these pieces of student work represents student-driven work.

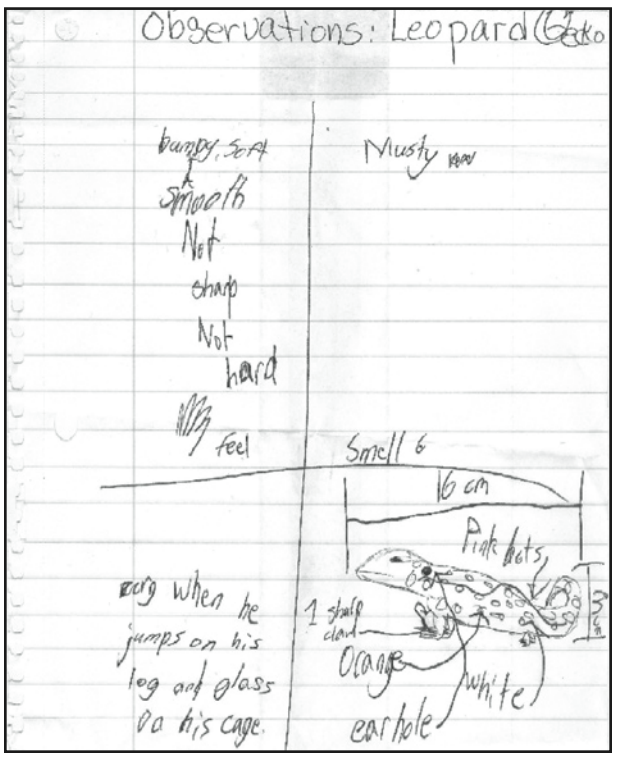
Using Notebooks as a Tool to Develop Self-Motivated Learners

As this school year comes to a close, we call attention to two resources for implementing notebooks into your every day classroom practices. The first book, *Science Notebooks: Writing about Inquiry*, is written by two classroom teachers, Brian Campbell and Lori Fulton, of the Clark County School District in Las Vegas.

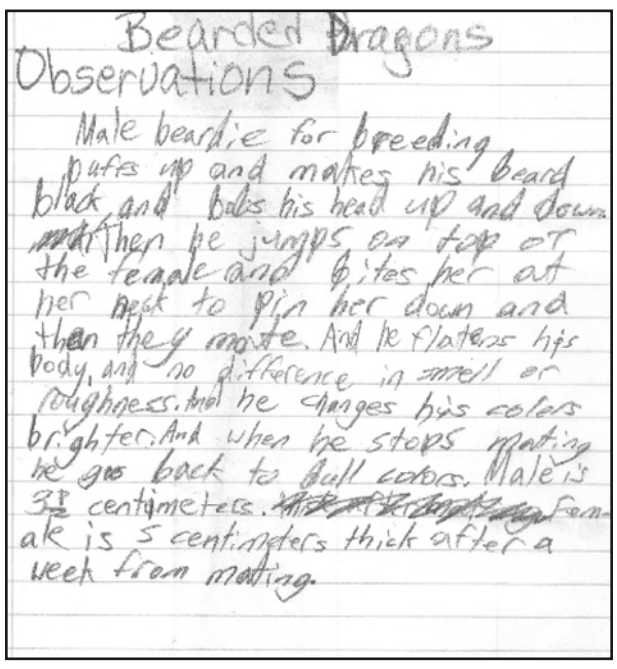
The other book, *Using Science Notebooks in Elementary Classrooms,* is written by Michael Klentschy and is based on his work integrating science and language for English learners right here in California's Imperial Valley.

Both books take up the topic of scaffolding, the use of notebooks for students and provide specific examples of scaffolds that move students away from teacher dependence toward self-directed learning. Read, digest and enjoy!! ■

Sample C



Sample D


Bearded Dragons
Observations
Male beardie for breeding puffs up and makes his beard black and bobs his head up and down. Then he jumps on top of the female and bites her at her neck to pin her down and then they mate. And he flatens his body, and no difference in smell or roughness. And he changes his colors brighter. And when he stops mating he go back to dull colors. Male is 3½ centimeters. Female is 5 centimeters thick after a week from mating.

A GOOD STORY, CONTINUED FROM PAGE 3

with technology and projects. I have also created a few science enrichment activities.

I look forward to this year's Summer Institutes and my third year in the K-12 Alliance so I can bring more science into the classroom. Although I am no expert, I am more confident with my knowledge in science and lesson planning – and I want more!

Overall, I realize that I have really enjoyed learning about science. I love giving thought-provoking questions to students. I love that there are times when they can just be thinkers and experiment. I love the look on their faces when I tell them to just try and test it out. Most of all, I love when they get so excited to figure out the answers themselves through investigation. They really feel a sense of autonomy and pride. And this is any teacher's dream! ■

Dana Hayes is a fifth grade teacher in the Temecula Unified School District.

FROM SPEECH TO PAPER, CONTINUED FROM PAGE 3

during their observations was becoming routine; it was a habit the team did throughout the day, not just during ELD/science instruction.

To go beyond oral language to written language, the team knew they needed to provide proper bridges for the students so they could move from orally observing, describing and comparing rocks to writing about rock similarities and differences in their notebooks.

The team decided that good scaffolding would be a double-bubble thinking map, a student word bank and sentence frames appropriate for the varying language levels of the students. (See Student Work 1 on page 3.)

As it turned out, students were successful during the first lesson, easily going from oral to written language. When the team looked at the student work, they agreed that the double-bubble thinking map was the main tool the students needed and decided to use that technique again in the second lesson.

Examining the student notebooks afterward, the team realized that some students did not use the sentence frames provided by the teacher, but rather crafted sentences on their own! The team decided to "mine" the student notebooks for additional sentence frames that matched the ways children actually speak and write. It was indeed a surprising gold mine, because during the second lesson, the team discovered that student generated sentence frames were very successful and relatable to the students. (See Student Work 2 on page 3.)

Overall, the second grade team at RPS believes they are truly on their way to helping their students make gains in understanding both science and English language proficiency.

A focus on high quality science instruction at RPS is not a new idea, but rather one that has developed over time as a whole school effort. Beginning with Montebello USD's CaMSP program (2004-2008), teachers of grades 5-8 were immersed in science content and pedagogy during the summer institutes. Throughout the school year, teachers continued to develop science lessons via the TLC.

The CPEC/ ITQ program funded K-2 teachers in a similar program that added ELD instruction to science. To complete the whole school effort, district funding supported teachers of grades 3-4 in the same type of rigorous professional development. This perfect storm of grant funding coupled with district and site administration support is making science accessible to all learners at RPS – a goal the RPS teachers say is within their grasp! ■

Attention

What's the Big Idea? newsletter will soon be a click away

This is the last printed copy in *California Classroom Science*

Find us next year on the web at www.k12alliance.org

Porzornost **Attenezione**