Take AIM When Choosing Materials

Editor’s note: Continuing to celebrate 20 years of professional development success, the lead stories for this and the March issues address the importance of advocacy for quality science education.

This year, every district in the state has the opportunity to decide what it stands for and what it supports in science education by their selection of instructional materials for grades K-8. The state recently adopted 11 publishers for these grades, giving districts a wide variety of content material, instructional design and relevance from which to choose.

Whatever process your district uses to select, we encourage you to be thoughtful and make your decisions based on evidence. And remember: your choice will be with you for 7 more years! Make it count!

When you consider the role of instructional materials in the teaching/learning process, what comes to mind? Are you interested in materials that are student-centered? That have concepts coherent to develop student understanding? Use a variety of assessments to measure student achievement? Provide resources to assist the teacher in teaching the content?

Well, as we know, all instructional materials are not created equally!

Some curriculum developers design instructional materials as a framework wherein learning experiences are organized and sequenced to maximize student outcomes. These outcomes include understanding science as a way of knowing and as a body of knowledge.

Other developers represent science primarily as a body of facts to be learned by the students, often including hands-on activities to simply verify concepts previously described in the text. Unfortunately, this approach to curriculum development has often resulted in instructional materials that are not supportive of how people learn (Bransford, et al., 1999) or reform-based teaching practice (Kesidou & Roseman, 2002; Hubisz, 2001).

So how can you best select instructional materials that will meet both teachers’ and students’ needs? In a nutshell: skip the status quo!

Instead of going through a process that is often opinion-based (rather than evidence-based), cursory (i.e. the “thumb-nail” test) and isolated from professional development and classroom practice, use the Analyzing Instructional Materials (AIM) Process.

What is the AIM Process?

AIM is an evidence-based process for analyzing and selecting instructional materials that was designed as a professional development experience to support curriculum implementation.

Developed by the K-12 Alliance (WestEd) and adapted by BSCS, the AIM process uses collaborative inquiry focused on asking questions, gathering information and making decisions based on evidence.

The AIM process is comprised of three major phases: pre-screen, paper screen and pilot (see Fig. 1) which can serve as the centerpiece of a professional development program as well as being a “springboard” for sustained curriculum reform.

More specifically, the three AIM phases includes:

• The pre-screen phase is a process to narrow the choices of instructional materials for a complete review using the AIM process. In the pre-screen phase, reviewers look at student assessments and investigate how students come to know that which they would produce on assessments. Materials that align with a district’s criteria for quality learning experiences remain as contenders; those materials that are misaligned are dropped from consideration.

• During the paper screen phase, instructional materials are analyzed by the selection team and data is gathered to determine how well the instructional materials meet each of the district’s selected criteria/rubrics. The scores from each criterion are then weighted and summarized. This results in identifying instructional materials to be piloted.

• The pilot phase is a systematic approach for determining if the materials “work with students” and with teachers. Data is gathered from student work and from teacher reflections. This data is analyzed and finally integrated with the evidence (scores) from the paper screen. A final score – based on the paper screen and the pilot – is achieved. The instructional materials are then rank-ordered from these scores and a final selection is made.

The AIM process addresses the limitations of typical selection processes by helping schools and districts understand the characteristics that distinguish high quality student-centered instructional materials from more traditional materials.

In addition to examining the science content in instructional materials, the AIM Process asks...
Things I Didn’t Know When I Decided to Teach

BY KATHY DIRANNA

The big idea? The materials engage students in activities that have many characteristics of quality learning experiences.

And I didn’t know that one day, I would no longer call teaching my job, but my privilege. I have been lucky that that day is everyday. I am humbled by those of you who have contributed your time, energy and hearts to improving science education, I say thank you on behalf of the students’ lives you’ve touched.

And finally I say OK… I’m happy to be on the road again!

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Is the Coach Supposed to Learn More than the Student?

BY MICHAEL COUGHLIN

I’ve cliché to suggest that, as a leader working with teachers, “I’ve learned more from you than you’ll ever know.” However, after a year and a half as a Science Coach for fourth and fifth grade teachers, that truth becomes more apparent every day.

I had not yet had the opportunity to observe the LEADERSHIP cadre in action when I arrived. I was immediately impressed by the collaborative, problem-solving culture that pervaded the cadre. The cadre leader, Lorrae Smith, showed me the value of a cadre approach to professional development.

The first time I observed a LEADERSHIP cadre meeting, I was struck by the level of expertise and collaboration among the cadre members. They were not just sharing information, but they were working together to solve problems and develop new strategies for teaching and learning.

As a result of my observations, I have come to believe that a cadre approach to professional development is essential for improving student achievement. Cadres provide a powerful tool for teachers to learn from and with each other, and to develop a deeper understanding of the science content and pedagogical strategies that are effective for their students.

In conclusion, I would like to thank the LEADERSHIP cadre for their hard work, dedication, and commitment to improving science education. Their example has inspired me to work harder to help all teachers learn more from each other.

LEADERSHIP

Cadre: Through the Eyes of One Professor

BY DR. DAVID POLCYN

The mind, once expanded to the dimensions of larger ideas, never returns to its original size. — Oliver Wendell Holmes

The invitation came through a phone call from a K-12 Alliance regional director. Would I like to teach in a cadre of teachers for the upcoming summer institute for elementary teachers? Working in a summer institute was familiar to me but what was a cadre?

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LEADERSHIP

Collaboration

Content Saturday, Garvey-Style

BY GRETA SMITH

“W” is for what has become a staple of any science teacher’s summer: Math On The Beach!

“W” is for what has become a staple of any science teacher’s summer: Math On The Beach! We have been reading about the success of Math On The Beach (MOTB) for several years now, and it was an honor to participate in this summer’s MOTB. The MOTB is a program that brings together middle and high school science teachers from around the state to work with scientists and mathematicians on real-world problems.

The MOTB is a week-long program that focuses on the integration of mathematics and science. Teachers participate in activities that involve solving real-world problems, and they work with partners from other disciplines, such as economists, biologists, and chemists. The activities are designed to help teachers develop a deeper understanding of the connections between mathematics and science, and to improve their ability to teach these concepts in the classroom.

The MOTB is open to teachers from all over the state, and it provides a unique opportunity for teachers to work with scientists and mathematicians on real-world problems. The MOTB is a great way for teachers to improve their own understanding of mathematics and science, and to develop new strategies for teaching these concepts to their students.

In conclusion, the MOTB is a great opportunity for teachers to improve their own understanding of mathematics and science, and to develop new strategies for teaching these concepts to their students. The MOTB is a week-long program that focuses on the integration of mathematics and science. Teachers participate in activities that involve solving real-world problems, and they work with partners from other disciplines, such as economists, biologists, and chemists. The activities are designed to help teachers develop a deeper understanding of the connections between mathematics and science, and to improve their ability to teach these concepts in the classroom.

Collaboration

MATH ON THE BEACH — Participants Daniel Felix (from left), Blanca Quirao, Scott Castroll and Pat Mohn at a recent content session do more than play in the sand. Following di-

isions, the team used mathematics to design a coordinate plane and a large sand fish.

At the next step, participants removed the pennies/washers until the canister was made to float just below the surface. Expanding on the activity partici-

pants hard just done, volume became the constant and the mass within the container was held constant. For both activities, participants collected data on how the objects behaved in water.

A brief discussion followed on how density effect-

ed floating. “Where is the point when floaters became sinkers and sinkers became floaters?” asked David. Participants looked stumped at this point, they were
directed to use the data that was gathered in the previous activ-

ities and create a mathematical explanation for the posed question.

The follow-up activity had participants find the mass and volume of several different materials including water, butter, bromine, and Styrofoam. Data points for mass and volume and were graphed and the line that connected data points for each material
type had a slope that became their density.

With different density lines, the graphs became a visual representation of which materials were floaters or sinkers in water.
enables teams to construct their own collective understanding of instructional materials. It is not something that can be conducted in isolation, but requires the collaboration of teachers and administrators.

The AIM Process is not a means to an end, but rather, the beginning of professional development focused on curriculum implementation. The basic AIM steps include:

- Determining selected criterion that addresses context and critical issues specific to the district’s needs.
- Gathering evidence to support or refute selection of the instructional materials through a thorough examination.
- Analyzing evidence and applying rubrics based on the selection criteria.
- Scoring components based on analysis of evidence and application of rubrics.
- Summarizing results and reaching a consensus.

One of the most important characteristics that distinguishes the AIM process from other curriculum selection/evaluation processes (see AAAS, 2001; NRC, 1999), is its usefulness as a professional development strategy. While other processes tend to focus on using a series of standards or benchmark-alignment checklists that may be done by separate committees or individuals working in isolation, the AIM process is unique because it engages all teachers – who will be the ones ultimately using the instructional materials in their classrooms.

In addition, educators learn how to think critically about instructional materials and address implementation issues (e.g., time, resources, professional development) when they use the AIM Process. Thompson and Zuelli (1999) point out that “a high level of cognitive dissonance to disturb the fundamental equilibrium between teachers existing beliefs and practice” is necessary for transformative learning to occur. The AIM process is such a tool – it causes cognitive dissonance.

Teachers, who have experienced the AIM process, have commented that they will never look at learning, teaching or the role of instructional materials in the same way again.

**How can the AIM Process meet your needs?**

AIM is an effective process that helps educators and other stakeholders in understanding and implementing a shared, common vision of science education. As schools narrow their options for standards-based instructional materials, they can make more informed decisions about which materials to select.

The K-12 Alliance can help your district select its instructional materials for K-8 as well as for high school science. Through a scenario-based training, we provide your teams with sample criteria, rubrics, tools for gathering evidence, and a process for scoring materials. Teams may adopt and/or adapt these tools and resources to their particular context and needs.

Contact the K-12 Alliance main office or your regional directors for further information and to set up training sessions.

**References**


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**Fig. 3**

<table>
<thead>
<tr>
<th>Selection Criterion</th>
<th>Analyze Evidence &amp; Apply Rubric</th>
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<tbody>
<tr>
<td>Gather Evidence</td>
<td>Score Component</td>
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<tr>
<td>Summarize Results</td>
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**IS THE COACH...CONTINUED FROM PAGE 3**

the team discovered that the concept really was a smaller idea, not needed for the grade level, or aligned to the standards. We decided to eliminate a part of the conceptual flow that we previously thought was important. Although the lesson was effective, there were more important ideas to bring to the classroom.

- It’s difficult to remain focused on the concept.

As a facilitator of collaborative work, I find it necessary to ask questions that keep teachers planning and reflecting on the concept at hand — but it’s sometimes extremely difficult to find and ask those questions.

By asking reflective questions, I have to consider the pedagogical implications, rather than simply supplying activities or resources for them. I can have them go through the procedures — just like students — but if the conceptual reasoning is missing, learning will not occur, for the teachers, the students or me!

There are more secrets, but that’s enough for now. The learning continues for us all.

Michael Coughlin is a Teacher on Special Assignment (TOSA) in the Lodi School District.

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**CONTENT SATURDAY...CONTINUED FROM PAGE 3**

Participants had plenty of mathematical conversations that day, many centered on the differences in ratios and proportions. These lively mathematical discussions happened only because participants shared a common activity that simply illustrated mass, density and volume. Overall, with the talents of the Institute of Higher Learning and CSULB, Garvey teachers had an unforgettable and satisfying professional development outing — not to mention a trip down memory lane being back in a college classroom!

Greta Smith is a Teacher on Special Assignment (TOSA) in the Garvey School District.

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**OOPS!**

The Nov./Dec. issue of What’s the Big Idea? contained two editorial errors. Please note that on page one, Fig. 1 omitted two column headings that should have read: Less Of and More Of.

In addition, Kathy DiRanna’s Director’s Column was misabeled.