come to the teaching of mathematics with a combination of trepidation, lack of confidence, fear of the subject matter, and a general lack of comfort.

In contrast, when teaching reading and language arts, elementary teachers are generally comfortable with the concepts and skills to be taught and take delight in watching their students become competent readers. Their eyes light up when they find the perfect book for a particular student. But I don't often see elementary teachers with the same attitude toward or intuition about math activities or materials. They don't see the potential in math instruction for the kind of involvement, excitement, and creativity that emerges when they are teaching reading.

We know that children learn best when they connect new learning to their existing knowledge and skills. I think that the same holds true for how teachers teach. So how can principals help teachers build on the skills and strengths they demonstrate in teaching reading and language arts to improve their math teaching? One way is to initiate, as I did, a schoolwide conversation to help teachers think about what they can apply from their teaching of reading to their teaching of mathematics.

What do you think is important when teaching reading?” I asked a group of teachers recently. They seemed surprised, since I had come there to conduct a two-day professional development session on math instruction.

“Did you mean about reading or about math?” Justin asked gently. I think he was trying to rescue me.

“About reading,” I responded. Then I asked the teachers to work in small groups and list their ideas.

That opening question was deliberate. From my experience providing professional development in mathematics to teachers over the past 30 years, I'm convinced that one of the greatest challenges is teachers’ content knowledge. When in college, many took only the required courses in mathematics, and they often
saw comprehension as key to reading fluency, in math they often felt relieved when students could just compute accurately. One teacher commented, “Sometimes I know that the students really don’t understand why they are borrowing or carrying, but I don’t know what to do.” The teachers also revealed that the confidence they felt in their ability to articulate what they were doing with reading instruction didn’t exist in their math instruction.

To build their confidence, we first discussed one aspect of teaching reading that is different in teaching math. In reading, there is one gatekeeper skill—decoding. It is the essential skill that gives readers access to the entire world of printed matter. However, there isn’t a comparable gatekeeper skill for math. Children must first learn to count and then add and subtract small numbers. Next, they learn about place value and working with larger numbers before moving on to multiplication and division.

All of this early learning relates to whole numbers. Then students have to learn about fractions, decimals, percents, and so on. There is no one gatekeeper skill that children can practice and perfect; they must build a succession of skills.

**Comprehension is the Key**

But there is one significant way that teaching reading and math are similar. When a child is learning to read, everybody knows that proficiency is all about bringing meaning to the printed page. For example, I can “read” anything in Spanish, since I’ve studied some Spanish, yet still not understand much of what I’m reading. Likewise, no child can be considered to be a proficient reader if he or she can pronounce the words but doesn’t understand the material. Comprehension is key to being a successful reader, and the same standard should hold true for math.

If children have memorized the math facts and can perform computational procedures, teachers often think of them as proficient. But we’ve seen over and over again how children can borrow, carry, bring down, or invert and multiply without understanding why the procedures work or how to apply them to problem-solving situations. The challenge is to help math students develop meaning and make sense of what they do.

When I asked the teachers to translate some of the instructional strategies they were comfortable using for literacy into opportunities for teaching math, these were some of their responses:

- In reading, teachers often ask students to make predictions about what might come next; in math, they can ask students to make estimates before solving problems.
- In reading, writing and oral communication are important aspects of instruction; in math, having students write down and discuss their ideas can help them develop, cement, and extend their understanding.
- In reading, teachers do not expect children’s writing to be identical, even when writing about the same topic; in math, teachers can

### Teaching Math by the Book

There are hundreds of children’s books that are appropriate and effective for teaching mathematics, and many are available in school libraries. I’ve compiled a list of more than 100 such books that your school librarian can check. (Go to www.mathsolutions.com, click on Publications, and you’ll find a link to the At-a-Glance Chart of Children’s Literature.)

Choose a book that has appeal for a wide range of grade levels. For example, try *Chrysanthemum*, written and illustrated by Kevin Henkes. It’s about a little mouse named Chrysanthemum who is tormented by others in her class who make fun of her name for being too long and for being the name of a flower. It’s a tender story and the characters and situation are unforgettable.

Read the book aloud to young children and then write Chrysanthemum on the board with the author’s first name, Kevin, underneath. Ask the children: How many more letters are there in Chrysanthemum than in the author’s name? Children can use interlocking cubes to make a train of 13 cubes to represent Chrysanthemum and another train of five cubes to represent Kevin. Then they can compare the lengths of their own names to Chrysanthemum. Older students can compile a graph of the lengths of all of the first names in the class, including Chrysanthemum, and then figure out how many letters are in their combined names.

Children’s books won’t answer all of the needs for improving math instruction, but they serve as one way in to encourage teachers to take a new look at their math teaching and to build their interest in further professional development for teaching mathematics.
encourage different methods for reasoning, solving problems, and presenting solutions.

- In reading, vocabulary instruction is integral; in math, teachers can start a word chart for math terminology, consistently use correct math vocabulary, and encourage children to do the same.
- In reading, read-aloud books provide students with common experiences from which they can learn; in math, there are many children's books that can provide a stimulus for problem-solving (see sidebar, page 2).
- In reading, teachers blend whole-class discussions, small-group instruction, and individualized reading and writing; in math, the same strategies can be appropriate and effective.

For principals to help teachers make significant improvement in their math instruction, it's essential that they deepen teachers' understanding of the mathematics they have to teach. Teachers can't teach what they don't understand, and they can't teach well what they don't appreciate. Talking to teachers about math instruction in terms of reading instruction can give them a different and more positive perspective.

Marilyn Burns is the founder of Math Solutions Professional Development (www.mathsolutions.com). Her e-mail address is mburns@mathsolutions.com. © Copyright Marilyn Burns 2005

Reproduced with permission from Leadership Compass and Marilyn Burns. Copyright © 2006 by Marilyn Burns. Reprinted with permission. All rights reserved.

In the Real World

In my last column, I talked about changing my meetings from informational to educational sessions— and I have to say that my first attempt was a success.

After attending a two-day workshop titled “Differentiated Supervision and Professional Development: Using Multiple Vehicles to Drive Teaching and Learning from Good to Great” this summer, I decided to use some of the methods I learned there. I wanted teachers to leave the first meeting with a vision for their schools.

Teachers entered the library and saw bowls of nuts and chocolate, cold water bottles, and yogurt on the tables. All materials needed for the learning session were in the middle of the tables as well, such as pencils for all, a pack of markers, and chart paper. After I explained my goal for the meeting, the teachers focused on answering the following questions:

- What processes or strategies improve instruction and enhance academic rigor for students?
- What forms of formative assessment would you use to measure students’ growth and achievement?
- How would you use the data from your assessments and assignments to guide your teaching?

Teachers answered the questions individually, discussed their answers at their table groups, regrouped depending on the colored paper in their packets, wrote their group answers on chart paper, read other groups' answers, and discussed all answers as a large group before wrapping up. The teachers actively participated, and even asked me to type up the responses so they could each have a copy. (I was so excited!)

I'm very glad I began the process of changing my meetings to learning sessions. I feel that the goals I have for my buildings will be better shared and implemented with the teachers. The food and prizes I offered didn't hurt, either!

In August, I asked for ideas on how principals can motivate and inspire their teachers. Thanks to those who responded: Here are two ideas that I wanted to share (and use myself):

- Terry Barber, a principal in Olympia, Washington, e-mailed an idea from a principal who calls two or three teachers’ homes each week and leaves positive messages they can hear when they arrive home.
- Donna Beeley, a principal in New Gloucester, Maine, wrote that she cut out paper pumpkins, wrote “Don't you just love October?” on them, numbered the backs, and circled three of the numbers. The teachers who received those pumpkins got prizes of Halloween candy.

For my next article, I’m asking my fellow principals for ideas on how to introduce a sensitive change to your staff. Change is difficult for first-year as well as veteran teachers. How do you pave the way for your new building initiatives? How do you gently nudge your reluctant faculty members? Do you recognize your stars when they begin to implement the changes? Please reply to me at sweber@punxsy.k12.pa.us.

Signing off from the educational “real world,”

Sharon Weber
Principal, Mary A. Wilson,
Bell Township, and Mapleview Elementary
Punxsutawney Area School District,
Pennsylvania
sweber@punxsy.k12.pa.us

Winter 2005

Leadership Compass