SCHOLASTIC

Instructor

26 Great Ways to Spend Your Summer

MARILYN BURNS

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USING STORYBOOKS TO TEACH MATH

For many of us, the storybook shelf isn't the first place we go to when we start to plan a math lesson. But children's books can be a great math teaching tool. They spark students' imaginations in ways that exercises in textbooks or workbooks often don't. When I visit classrooms, I find that connecting math to literature can boost the confidence of those who love books but are "math-wary." And students who love the abstraction of math can learn to appreciate stories in a whole new way. Here are just three of the many possible lessons based on favorite classroom read alouds. ▶
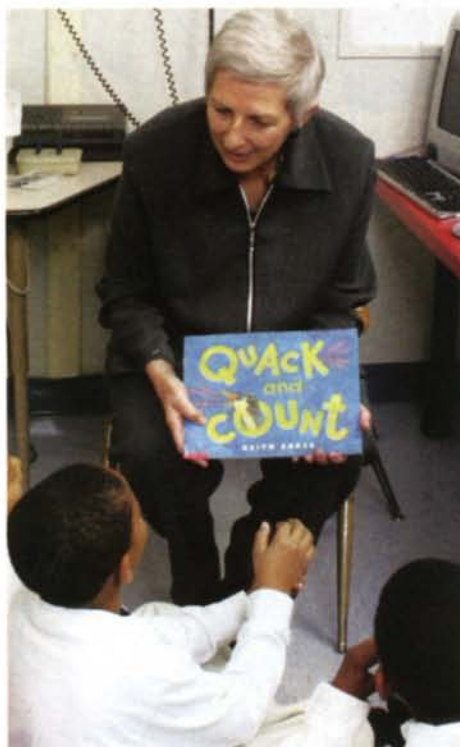
LESSON #1
ADDITION WITH *QUACK AND COUNT*

When I first read Keith Baker's wonderful *Quack and Count* (Harcourt Brace, 1999), I knew it would be ideal for a first-grade lesson about ways to break numbers apart into different addends. On my next visit to the classroom, I began our lesson by gathering students on the rug. I showed the children the cover and read the title and author's name.

"It's about ducks!" Nelson exclaimed after my introduction. "Ducks go quack," he added.

"Let's find out," I responded. I opened to the first spread and read, "Seven ducklings in a row. Count those ducklings as they go." The children counted along with me as I pointed to each of the ducklings.

I asked the children to count as I read the next rhyme—first the six ducklings on the left and then the one duckling on the right.

"How many ducklings do you think there are all together?" I asked. Some of the children knew that there were seven, while others weren't so sure. Together we counted all of them to verify that there were indeed seven!

I continued reading the rest of the book aloud and asking questions in this same way. On each page, we counted. We then had a class discussion of the book, talking about all the

LESSON #2
TEACHING MEASUREMENT WITH *INCH BY INCH*

In Leo Lionni's *Inch by Inch* (HarperTrophy, 1996), a clever inchworm persuades a robin to spare his life by offering to measure the robin's tail. He goes on to measure a flamingo's neck, a toucan's beak, and other animals' parts. When I shared this book with a group of lively second graders, they were delighted by the way the worm inched his way to safety.

After reading the story together, the children and I launched into a measurement lesson. We used a one-inch square tile to measure the length of the inchworm in the book.

Then I put down the book and asked the children, "I wonder if any things in our classroom measure about one inch long." We tested various items—the width of a chalkboard eraser, the length of a pencil, the spines of several books. None was close. Then I held up an envelope with a postage stamp on it. Several of the children clapped when they saw that a side of the stamp was just about one inch long. Then we measured a quarter and discovered that it was one inch across.

On a sheet of chart paper, I wrote *One Inch* and underneath recorded *stamp* and *quarter*. With the One-Inch Challenge underway, the children moved about the classroom with their one-inch tile "worms" in search

things the ducklings did.

For the second reading, I turned the focus to recording equations that would show our work. As I read, I wrote number sentences on chart paper to keep track of the ducklings. For example, as the children counted the six ducks on the left and one on the right, I recorded:

$$7 = 6 + 1$$

I had the children read the number sentence aloud as I pointed to the symbols. Then I invited them to help me write equations for the rest of the story. A nice feature of this story is that the illustrations near the end of the book encourage thinking about seven with more than two addends. When we finished the rereading, the chart looked like this:

$$7 = 6 + 1 \qquad 7 = 2 + 5$$
$$7 = 5 + 2 \qquad 7 = 1 + 6$$
$$7 = 4 + 3 \qquad 7 = 2 + 3 + 2$$
$$7 = 3 + 4 \qquad 7 = 2 + 2 + 2 + 1$$

I then gave the children seven Unifix cubes each and had them show the combinations by representing each addend with a "train" of cubes.

Lastly, I gave the children an independent assignment. Each child chose one of the number sentences from the chart, copied it, and illustrated it. "You can draw ducklings or any other shapes," I told them. The result: artful number sentences from ducks to diamonds! Children ready to take on an additional challenge also wrote and illustrated their own equations, with combinations of more than two numbers that added up to seven.

LEFT: *I begin the read aloud by asking the children to judge the book by its cover.*

ABOVE: *The children use trains of Unifix cubes to represent simple equations. The cubes also make excellent finger puppets!*

LEFT: *Leo Lionni's* Inch by Inch *is an ideal choice for combining literacy and hands-on learning.*

CENTER: *In our One-Inch Challenge, the children comb the classroom looking for objects the size of the inchworm hero.*

of objects to measure. As they called out items, I listed them on the chart. After about 10 minutes, I called the children back to the rug and we reviewed the items on our list, from crayon stubs to barrettes.

Next we moved on to measuring longer lengths, starting with our index fingers. I traced my index finger on the board and showed them how I could measure its length in two ways—using tiles and also using a 12-inch ruler. We next measured a pencil and the height of a tissue box using the same two ways. I showed the children that there are three possible ways to record our measurements, as shown below:

Finger	3 inches	3 in.	3"
Pencil	7 inches	7 in.	7"
Tissue box	4 inches	4 in.	4"

Armed with a tile and a ruler, each child set off to measure at least five objects and record their findings in the three ways.

After about five minutes, I stopped the children to ask what we could do when a measurement wasn't an exact number of tiles, or fell between two numbers on a ruler. We talked about choosing the number that was closest (rounding) or, if they couldn't tell, adding half of an inch to the measurement.

A few weeks later, we repeated the activity again. First, we reread the book, savoring the story and the illustrations. Then the children again set off on a measurement quest, this time recording an estimate for each item before measuring. Afterwards we compared our estimates and the actual measurements. The children charted their results on posterboard.

When the math lesson ended, the children had the chance to take the book and their measuring tools home to share the story and their new skills with their families. ▶

TEACHING MENTAL MATH WITH *NIGHT NOISES*

Mem Fox's book, *Night Noises* (Voyager, 1992) is filled with vivid language and opportunities for math learning. In it, the elderly Lily Laceby, with hair "as wispy as cobwebs in ceilings" and bones "as creaky as floorboards at midnight," is greeted with a surprise 90th birthday party!

Knowing that I typically come to her third-grade class to teach a math lesson, Areli raised her hand and said, "I bet we get to figure out how many people came to the party."

"You're exactly right," I said, and reread the passage describing the guests: 2 sons, 3 daughters, 14 grandchildren, 35 great-grandchildren, 1 great-great-grandchild, and 47 other friends.

"Can we use paper to figure it out?" Brittany wanted to know.

"Let's try adding in our heads," I suggested. I wanted to give the children valuable and much-needed practice with mental calculation. "Then we'll check our answer with paper and pencil," I added.

The children attacked the problem using a variety of strategies, and we recorded each one. For example, after we had determined that 19 people

had arrived (adding the 2 sons, 3 daughters, and 14 grandchildren), I asked, "How many would there be when we add on the 35 great-grand-children?" I wrote on the board: 19 + 35.

Assia offered her strategy first:
19 + 10 = 29   39 + 10 = 49
29 + 10 = 39   49 + 5 = 54
Kevin used a different method:
35 + 10 = 45
45 + 5 = 50
50 + 4 = 54

Working together and sharing strategies, we finally figured out that 102 people attended Lily Laceby's party. The children then turned to paper and pencil to check our work.

This *Night Noises* lesson illustrates several important benefits of using children's books for teaching math. It connects a basic skill—mental addition—to a "real-life" example and encourages different ways to arrive at answers. It supports communication in math class by asking students to explain their thinking. Lastly, recording their strategies helps children make the connection between their reasoning and mathematical symbols. ■

NIGHT NOISES

WRITTEN BY **Mem Fox** ILLUSTRATED BY **Terry Denton**

MORE GREAT BOOKS

Here is a starter selection of the many read alouds that are suitable for math lessons:

Kindergarten
A Pig Is Big, by Douglas Florian (Greenwillow, 2000).
What Is Square? by Rebecca Kai Dotlich (Harper Festival,1999).
Benny's Pennies, by Pat Brisson (Dell, 1993).

Grade One
98, 99, 100! Ready or Not, Here I Come! by Teddy Slater (Cartwheel, 1999).
The Shape of Things, by Dayle Ann Dodds (Candlewick, 1994).
Ten Sly Piranhas: A Counting Story in Reverse, by William Wise (Dial, 1993).

Grade Two
What's a Pair? What's a Dozen?, by Stephen Swinburne (Boyds Mills, 2000).
Stay in Line, by Teddy Slater (Cartwheel, 1996).
Only One, by Marc Harshman (Penguin, 1993).

Grade Three
512 Ants on Sullivan Street, by Carol Losi (Cartwheel, 1997).
The Greedy Triangle, by Marilyn Burns (Scholastic, 1995).
One Hundred Hungry Ants, by Elinor J. Pinczes (Houghton Mifflin, 1993).

Grades Four, Five, and Six
If You Hopped Like a Frog, by David M. Schwartz (Scholastic, 1999).
A Million Fish... More or Less, by Patricia C. McKissack (Random House, 1996).
Roman Numbers I to MM: Numerabilia Romana Uno Ad Duo Mila, by Arthur Geisert (Houghton Mifflin, 1996).