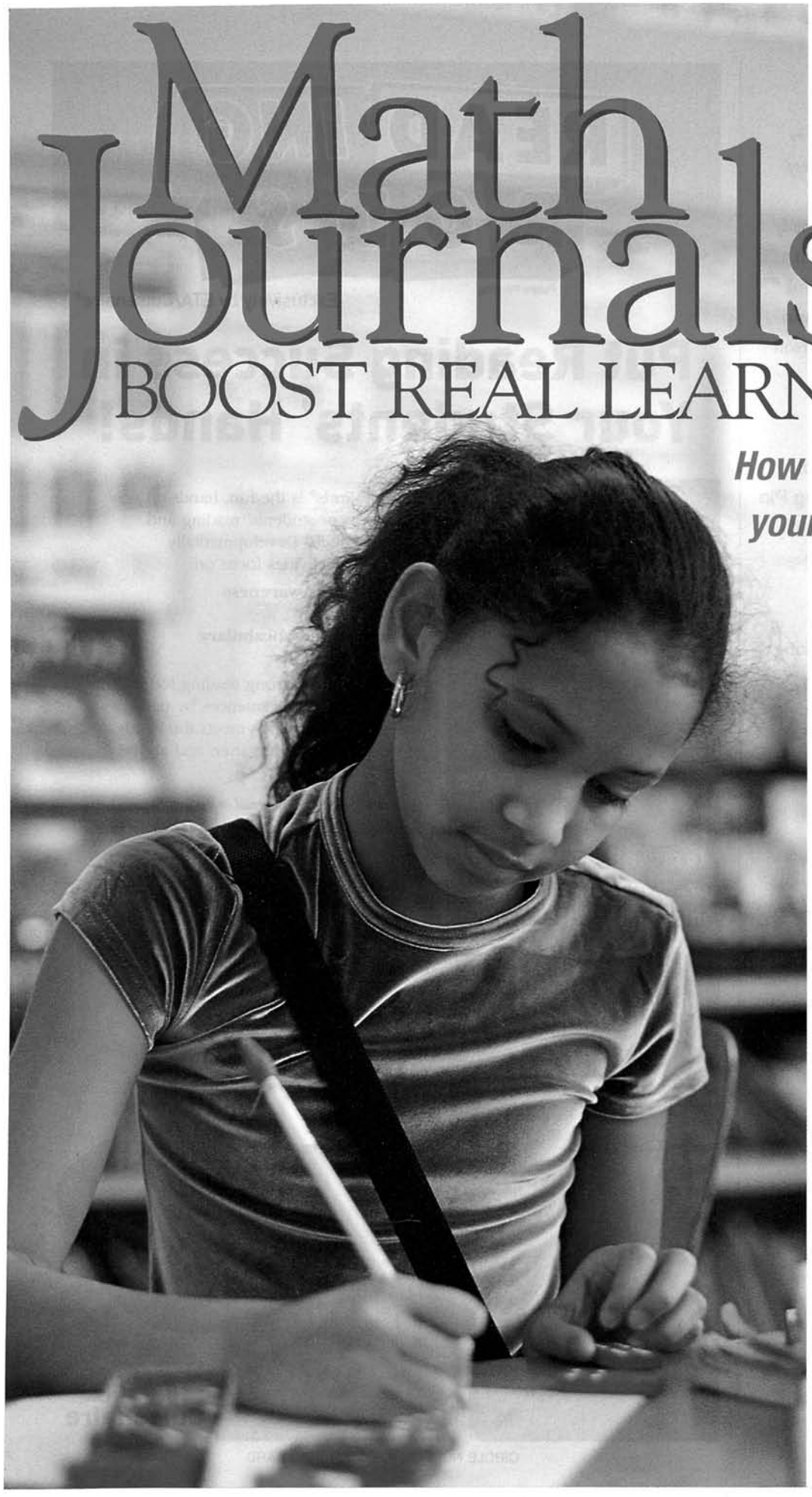
Math Journals BOOST REAL LEARNING



How words can help your students work with numbers

BY MARILYN BURNS AND ROBYN SILBEY

A math journal is one of the best ways to introduce writing into your math class. It helps students stretch their thinking and make sense of problems that can sometimes leave them confused or frustrated.

When children write in journals, they examine, express, and keep track of their reasoning, which is especially useful when ideas are too complex to keep in their heads. By reading their journals, you can evaluate their progress and recognize their strengths and needs. The math journal thus becomes a great learning tool for your students—and you. This is why we think it's good practice to incorporate journal writing in math class.

Here are some ideas to help you get started.

A Math Journal's Many Uses

How you use math journals will depend on your purposes, preferences, and the particular age and needs of your students. In some classes, children do all of their work in their journals, using them daily during lessons to keep notes and do problems. Or, teachers might ask children to write entries at the end of math class, describing what they did and what they learned, including things they're not sure about, or questions they have. Other teachers have students use their journals only for particular class assignments—when they give students a problem to do or a question on which to reflect.

There are many ways to motivate children to write: problem solving, process prompts, language experience, and class discussion.

Problem Solving

Keeping a journal can help students think through specific problems. For example, when teaching about quadrilaterals, a sixth-grade teacher asked her students to write why a square was a special kind of rectangle. In a third-grade class, children reported the results of their data-gathering assignment (how many times their home phone rang on the previous night, between six and eight) by writing their data on sticky pads, which they organized into a graph on the board. Before discussing the graph, the students wrote their conclusions about the graph in their journals. (See examples below and right.)

Process Prompts

To help students begin, you might have them reflect daily on their processes. One first-grade teacher made journals of stapled sheets of paper. On each sheet, children responded to two prompts: *Today I did...* and *Today I learned...*

A third-grade teacher did the same thing, but also had a space for the time at the top of each sheet, for children to practice reading the clock and recording what they saw.

Upper-grade teachers asked students to elaborate in their journals on the following prompts:

- *What I know about___ so far is_____.*
- *What I'm still not sure about is_____.*
- *What I'd like to know more about is_____.*

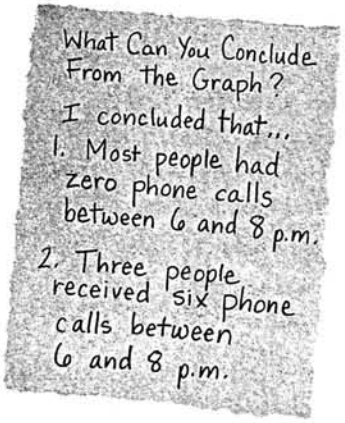
Language Experience

When children are having difficulty with an assignment, encourage them to explain their thinking to you. You might say, "Tell me your idea" or "Tell me what you're thinking." When they get out a sentence or two, stop them and say, "Let's start by writing down what you just said."

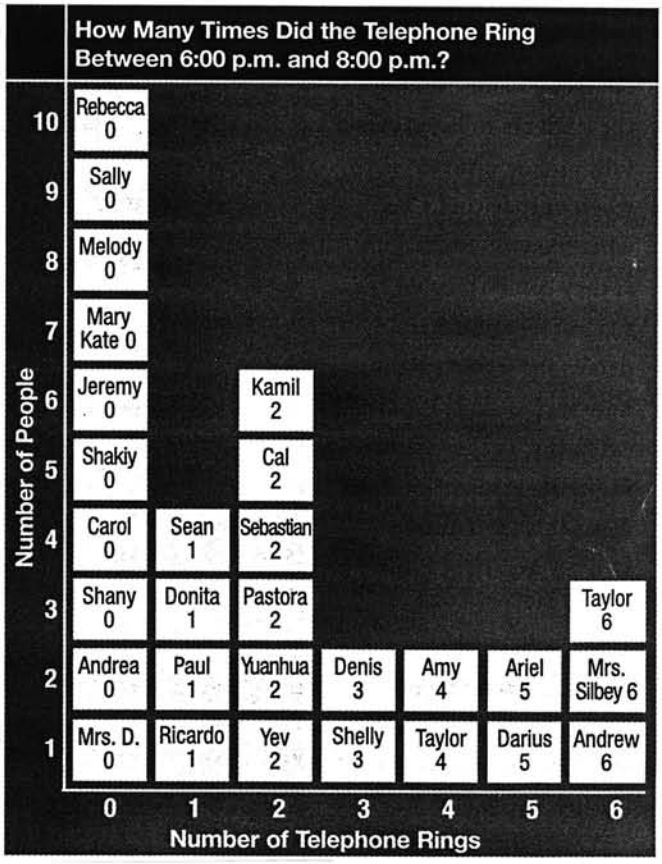
After they've written down their words, ask them to read the sentences aloud and say, "Tell me more about what you were thinking." Then, get them writing again. This allows you to gently motivate children to write, and to help them arrive at a satisfying product.

Class Discussion

You also might try giving all students the same assignment and then using



Third graders gathered data that helped them create this graph and write conclusions.



it for a class discussion. Ask them to describe what they did in an activity, rather than having them describe how they thought about a problem. For students, writing about what they think can be more difficult than describing a concrete action.

For example, after carrying out an estimation activity involving popcorn kernels, lentils, and structural cubes, second graders were asked to describe what they had done as if they were telling their parents what they were learning. Some children wrote detailed descriptions. Others wrote brief ones. The teacher chose a few entries to read aloud, without using names, asking the students to listen carefully and determine whether they could "see" what the writer had done. If they couldn't, could they suggest what further details the writer might have included? For each entry, the teacher asked:

- *Was the explanation clear?*
- *What made it clear?*
- *What more do you need to know?*

After the discussion, the students revised their entries, with a better sense of the thoroughness the teacher expected.

Responding to What Children Write

When reading entries, try to learn more about individual students. Think about these questions as you read: Is the answer correct? Does the student include reasoning that supports the solution? If computation is required, does the student use an efficient method and/or mental math? If appropriate to the problem, does the solution indicate use of estimation or anticipation of the magnitude of the answer? What would you still like to know about the child's thinking or response, even after evaluating the entry?

Don't feel you have to give individual comments on all entries. This is not only overwhelming, it's not necessary when children are learning. You will most likely find that the time to give individual feedback is when you are assessing individual progress.

When you do decide to give individual reactions, avoid general comments such as "Good job" or "Nice thinking," which don't offer the child any authentic feedback. Try to give responses that address what they wrote. Focus on the mathematics in the task and indicate your interest in how they think and reason, offering suggestions for further thinking. Even better, arrange time to speak one-on-one with students about their work. ■

JOURNALS: How to Store Them — Whether you buy journals or make them yourselves, you need a system for storing them. Some teachers keep journals in class at all times to prevent children from forgetting them at home or losing them. Students write their names at the top of the cover in heavy marker. When math class begins, one child distributes the journals. Some teachers also assign a number to each child, usually based on alphabetical order by first names. This facilitates filing journals in a box and checking to see if any are missing.

Math journals help students to clarify and extend their thinking. Robyn Silbey works with students on their math journals (below).

Marilyn Burns is a nationally known mathematics educator. Robyn Silbey is a mathematics specialist in Montgomery County, Maryland, and an author. This article was adapted from their book So You Have to Teach Math?: Sound Advice for K–6 Teachers, *(Math Solutions Publications, 2000). www.mathsolutions.com*