



## Learning and Mathematics

---

[On to the Discussion](#) || [Back to the Table of Contents](#) || [Back to Math Discussions Online](#)

---

### Writing Math - Countryman (1992)

In her book *Writing to Learn Mathematics*, Joan Countryman, the Head of Lincoln School in Providence, Rhode Island, explores the relationship between math and writing and provides a comprehensive description of the approach she takes to teaching math in middle and high school. Countryman stresses the idea that the use of writing exercises in math classes leads to both a better understanding of the material and heightened math communication skills. Furthermore, she believes that writing about math leads to a less restrictive view of mathematics - instead of a series of formulas and rigid answers, the students come to see mathematics as a process and a dialogue to which they too can contribute.

The techniques Countryman employs in her classroom include journals, freewrites, learning logs, written descriptions of problems, autobiographies, and formal papers. Personal expression is combined with formal mathematical language, so that students learn that math can have ties to all aspects of writing. *Writing to Learn Mathematics* mixes Countryman's personal philosophy with the specific lessons she teaches to give an overall view of the theory and practice of using writing to teach mathematics.

---

#### Book:

Countryman, J. (1992). *Writing to Learn Mathematics*. Portsmouth, NH: Heinemann.

#### Quotes and Comments

"Knowing mathematics is doing mathematics. We need to create situations

where students can be active, creative, and responsive to the physical world. I believe that to learn mathematics, students must construct it for themselves. They can only do that by exploring, justifying, representing, discussing, using, describing, investigating, predicting, in short by being active in the world. Writing is an ideal activity for such processes" (p. 2).

Countryman attempts to give her students the sense that mathematics is constructed by people, that it is an active, dynamic process. She contends that traditional math classes alienate students by giving them the impression that the basics of mathematics were discovered hundreds of years ago, and that constructing mathematical knowledge is neither a possible nor a necessary aspect of math class (pp. 7-8).

"We want students to learn to interpret unfamiliar texts, to construct convincing arguments, to understand complex systems, to develop new approaches to problems, and to negotiate the resolution of those problems in groups, to pose questions and to evaluate alternative responses to those questions... Students need opportunities to organize, interpret, and explain, to construct, symbolize, and communicate, to plan, infer, and reflect. Practicing these fundamental skills will help them learn mathematics" (p. 12).

For Countryman, one of the surest paths to these skills is a variety of writing exercises and the complete integration of these exercises into all aspects of the curriculum.

Countryman's strategies for incorporating writing into math classrooms range from personal to formal, from brief to long-term. She suggests that teachers begin to introduce writing into their classrooms by means of learning logs - personal accounts of the work done in class; freewrites, which often get at the heart of students' attitudes and feelings; finishing sentences (i.e., learning proofs is .....); commenting on assignments; finding definitions; and writing comparisons of different procedures (pp. 13-20).

Countryman says that math autobiographies are a mixture of the personal and the formal; they involve sharing feelings and individual histories, and also give students practice in writing about math. They offer a way for the student to communicate strengths, fears, weaknesses, and beliefs to the teacher, make students feel connected to mathematics by showing them how math can be incorporated into their lives, and unite a class as a community of shared

feelings. Autobiographies are to be written at the beginning of the year, to help open up dialogue and understanding between teacher and student (pp. 21-26).

Countryman uses journal writing as a way to have continuing dialogues with students (she comments in the journals every week) and as a vehicle for student self-expression. In her discussion of the use of journals, she summarizes the value of math journals in the following way: "Some purposes of journals:

- To increase confidence
- To increase participation
- To decentralize authority
- To encourage independence
- To replace quizzes and tests as a means of assessment
- To monitor progress
- To enhance communication between teacher and student
- To record growth." (pp. 42-43).

Countryman encourages teachers to keep journals to record their own experiences, and reminds them that her personal methods for using journal writing in the class may not meet the needs of others, who are encouraged to find their own ways to integrate journals into their lessons.

The debate over the utility and method of teaching word problems has long been a major issue in mathematical pedagogy, and Countryman adds to the discussion in her book. She believes that word problems can be useful, provided they involve student writing exercises so that the students can explore their own ideas. Many of her word problem examples involve creative stories which students can build upon in their answers. She writes that students often have trouble with word problems because of a larger inability to understand math language, but that writing about their learning processes will help reveal how much they do or do not understand (pp. 45-57).

The key to word problems, according to Countryman, is that they must pave the way for the students to write about math and learning - although word problems do not seem very different from the word-intensive style of her other lessons.

The formal papers expected of students are an integral part of Countryman's advanced math classes, papers on any mathematical topic covered during the year that interests the student (e.g., population growth in China, math attitudes and abilities of first- grade students). Countryman believes that the process of developing these papers is as important as the final papers themselves - that the thinking skills gained by creating a paper are no less valuable than the results of the research. She sees a major link between writing papers and problem-solving in that they are both recursive rather than linear activities (pp. 59-73).

Many teachers are concerned with evaluating student work and the time it takes to do such evaluations. Countryman addresses these concerns with a set of simple methods through which writing can be incorporated into the classroom without resulting in an overload of work for the teacher. She advises teachers to use a simple grading system divided into competent, satisfactory, and inadequate groupings. She also stresses the use of alternative methods of assessment (for example, as their examination she once asked her students to write five test questions). Finally she points out that the writing students do can itself be used for assessment, in that it gives an accurate picture of what students have learned.

Countryman ends her book with a discussion of the classroom dynamics she believes necessary to a successful math classroom. Through writing, everyone becomes active in the classroom and in the learning process. Collaboration is a fundamental component of learning, and writing can heighten the effects of collaboration. Finally, Countryman once again stresses the importance of students' participation in the construction of their own knowledge, and the valuable contribution of writing to that process (pp. 90-91).

- summarized by Jane Ehrenfeld

#### Privacy Policy

---

[Suggestion Box](#) || [Home](#) || [The Math Library](#) || [Help Desk](#) || [Quick Reference](#) || [Search](#)

---