

# Talking mathematics: resources for developing professionals

Rebecca Corwin with Sabra Price, and Judith Storeygard  
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## Summary

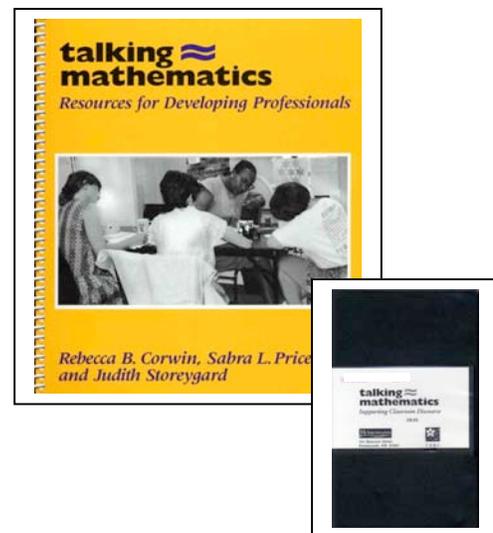
*Talking Mathematics: Resources for Developing Professionals* is a collection of videotapes with a leader's guide that offers strategies to help leaders engage teachers in professional development activities that focus on student understanding. The tool provides support for leaders to develop a reflective community and encourages teachers to do mathematics as a learner, reflect on their own thinking, try some strategies, reflect on their teaching, and reflect on students' thinking. It can be used with pre-service and in-service teachers of grades K-5.

## Purpose

This tool provides leaders with professional development resources, both text and video images, that feature classrooms where talking and thinking mathematically is routine.

## Tool description

The leader's guide suggests ways to organize a series of seminars to engage teachers in "doing" mathematics, reading selected articles, reflecting on their practice, and reflecting on children's talk through videotaped images of classrooms. The resources also include annotated tasks that can be used to deepen teacher's mathematical knowledge, engage them in rich discussions about the mathematics, and reflect on their own practice. The package includes an introductory videotape and *Talking Mathematics: Supporting Classroom Discourse*, a guide for teachers, which presents examples of mathematical discussions in K-6 classrooms and ways to support children's talk.



## Contents

### Leader's Guide Chapters

1. A Talking Mathematics Seminar
2. Creating a Reflective Community
3. The Mathematics in Talking Mathematics
4. Images of Practice: The Talking Mathematics Videotapes
5. Engaging Problems

**Videotapes:**

1. Talking Mathematics: Supporting Classroom Discourse, 18-minute videotape that provides a general introduction to using mathematical talk in classrooms. This introductory tape is included in the series, but can be purchased separately.
2. Talking Mathematics: Sharing Strategies (20 minutes)
3. Talking Mathematics: Patterns and Predictions (18 minutes)
4. Talking Mathematics: Definitions and Descriptions (20 minutes)
5. Talking Mathematics: Models and Representations (22 minutes)
6. Talking Mathematics: A Teacher Seminar (23 minutes)
7. Talking Mathematics: Classroom Episodes (44 minutes). This videotape includes a set of six unedited episodes from grades K-5 classrooms. The Staff Developer's guide includes written transcripts of the children's discussion.

**Background**

The strategies and ideas presented in this tool are the result of collaborative efforts of researchers and teachers from different schools and grade levels who participated in seminars of the Talking Mathematics project. The project staff worked with teachers who were exploring how to create cultures that support mathematical talk and inquiry. Teachers developed a learning community with their peers, solved interesting problems as "doers" of the mathematics, tried ideas in their classrooms, met regularly, and discussed their own practice in relation to what they were learning. Working on mathematics problems, not necessarily intended to be used in the teachers' classroom, proved to be an intellectual activity that teachers learned to appreciate and enjoy.

**Design principles**

The seminars were based on the following principles for teacher engagement:

Teachers

- doing mathematics together,
- reflecting on their own mathematical thinking,
- reflecting on teaching techniques, and
- reflecting on students' mathematical thought.

**Using the tool**

The set of resources can be used for multiple purposes:

- **Summer Institutes** This tool provides a rich set of resources that can support long-term, sustained professional development around developing mathematical understanding and using mathematical talk in classrooms. The resource provides guidance for organizing a series of experiences around themes. The guide includes a sequence of possible activities for a 3-week or 2-week institute. Establishing a culture of teacher reflection and writing is central to using this tool effectively. The companion tool, *Talking Mathematics: Supporting Children's Voices* is a book that offers strategies and selected readings to help teachers engage students in mathematical discourse.
- **Workshops** can be organized to tackle different aspects of mathematical discussions, throughout the school year. A leader might choose to spread the 2-week institute agenda over a 5-month time period. Allowing 2-3 weeks between sessions will give teachers an opportunity try some ideas

with their students. Teachers should be encouraged to write their reflections and bring them to future sessions.

### **Evaluative evidence:**

Talking Mathematics was a 3-year project by 12 experienced elementary school teachers with TERC to investigate ways to develop mathematical discourse in their classrooms. Researchers summarize the project's findings in the paper, "Talking Mathematics: 'Going Slow' and 'Letting Go'" Susan Jo Russell and Rebecca B. Corwin, *Phi Delta Kappan* (March 1993) Vol. 74(7): 555-558. Their findings include:

- teachers scheduled more time for mathematics,
- asked different kinds of questions and decreased a tendency of accepting the first right answer,
- required students to share their thinking, and students became better at doing so,
- structured mathematics experiences to focus on looking for patterns, making conjectures, generalizing, and developing rules and formulas.

### **Availability**

Copies may be obtained through Heinemann's website <http://www.heinemann.com>

### **Strengths**

- supports development of a leader's ability to ask questions that probe and challenges teachers' beliefs about what it means to know and to do mathematics,
- provides suggestions for planning and leading institutes
- includes interesting problems to engage teachers in "doing" mathematics along with some discussion about potential use of the problems with students
- uses high-quality videotapes
- provides context for using videotapes, discussion questions, and lessons learned by the project staff about engaging teachers in solving math problems
- supports development of a reflective community of learners focused on mathematics teaching
- provides classroom-based examples of mathematical talk and teachers' reflections on their lessons
- provides transcripts of the *Classroom Episodes* videotape
- includes a resource list organized by categories (e.g., Professional Development, Teaching and Learning)

### **Likely challenges**

- commitment from teachers and districts for sustained, long-term professional growth
- suggested problems may not fit into teachers' existing curriculum—need a range of problems that promote mathematical talk
- teacher anxieties around "doing" mathematics
- establishing a mathematics community that values reflection and risk-taking

- allowing time for teachers to wrestle with new strategies and issues that emerge around curriculum, teaching, and learning

### **Complementary tools:**

*Talking Mathematics: Supporting Children's Voices*

*Writing to Learn: Strategies that Work, K-12*

*Principles and Standards for School Professional Teaching Standards Talking Standards-based classroom teaching materials*

*Balanced Assessment for the Mathematics Curriculum: assessment packages*

*Classroom Discussions: Using Math Talk to Help Students Learn*

### **Other comments:**

The Talking Mathematics Project is described in an article published by Hands On!

[http://www.terc.edu/handson/spring\\_95/talkmath.html](http://www.terc.edu/handson/spring_95/talkmath.html) and

[http://www.terc.edu/handson/spring\\_95/suptalk.html](http://www.terc.edu/handson/spring_95/suptalk.html)