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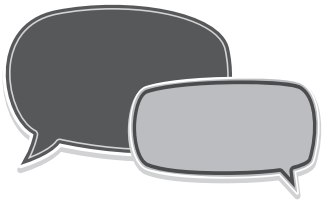
Mathematical Discourse

Let the Kids Talk!

Barbara Blanke
Foreword by Steve Leinwand



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Introduction

> **Each time one prematurely teaches a child something he could have discovered himself, that child is kept from inventing it and consequently from understanding it completely.**
>
> **—Jean Piaget 1970a, 715**

My goal for writing *Mathematical Discourse: Let the Kids Talk!* is to support teachers choosing to shift their mindsets about how they were taught math and were taught to teach math and to encourage them to begin using discourse to help their students understand and make sense of mathematics. So many of us were taught to explain, or show and tell, students what they needed in math, and we just crossed our fingers and hoped that they would learn it. We taught math and then assessed our students to see what they could and could not do, and we proceeded to teach them what we thought they needed to strengthen the desired behavior of coming up with a correct solution. We were encouraged to offer "hands-on" learning to induce "correct" understandings. Yet, many of our students fell behind and did not learn what they were supposed to master, and we moved on to make sure we covered the skills. This book's purpose is to support any educator who desires to shift his or her practice by becoming a reflective practitioner and promote discourse opportunities as a way to develop a deeper understanding of mathematics for all students. Inventing and understanding are critical to the development of a positive growth mindset. When we, as teachers, learn to foster disequilibrium, puzzlement, discourse, reflection, and argumentation, we are encouraging students to reason about mathematical ideas. We are using talk as a means to help students to think on their own. They no longer need the teacher to explain, or show and tell.

As teachers, we have to recognize what these necessary shifts in our mindsets are that will enable us to transform our classrooms into mathematical learning communities where students seek to deeply understand mathematics. The Common Core State Standards of Mathematical Practice and state process standards guide us to make certain all students persevere in solving mathematical problems with tenacity and confidence.

We use tools strategically, explore mathematical structures using visual models, attend to precision, and pose viable arguments to critique ideas to nurture student academic growth. Creating a classroom environment conducive for students to generate a depth of understanding of mathematics—rather than being told how to get to the answer—is critical. We, as teachers, have a new role: one of facilitator and mentor, rather than explainer. We want to teach our students to do more than a share-and-tell, we want them to talk about and justify their ideas, build mathematical arguments, and defend their thinking. The questions we should be asking are: How do we support this kind of classroom on a daily basis? Where should we begin? How do we learn to *Let the Kids Talk!*?

My purpose in writing this book on mathematical discourse is to empower teachers everywhere to believe in and nurture their students' ideas, questions, and arguments as budding mathematicians to become autonomous learners in their K–12 classrooms. It was in my own classroom that I experienced the influence of mathematical discourse. It was there that I learned with and from my students rather than delivering knowledge to them. My students taught me to slow down and listen to their ideas. It was my students who nurtured and challenged me to embrace my role as a co-learner and to ask, "Is there another way to support *ALL* of my students as they make sense of mathematics and develop the habits of mind of a mathematician?"

This book offers a brief history of mathematical discourse and takes you through specific strategies, methods, instructional approaches, resources, and activities to use with your students as they learn to make sense of mathematics on a daily basis.

The chapters include the well-researched and studied effects of discourse over the years, as well as various strategies, routines, teacher moves, and questioning techniques that will support you in transforming your classroom into a discourse-rich environment. The following chapters are discussed:

- Chapter 1, *What Is Mathematical Discourse?,* shares a brief history of mathematical discourse, some patterns that continue to influence how we teach mathematics, and why it is important to consider shifting our mindsets and teaching practices to include discourse in today's math classrooms. We explore how this knowledge can assist you in promoting mathematical conversations with your students.

- Chapter 2, *Discourse and Mathematical Practice and Process Standards,* highlights how sharing ideas, asking questions, and reasoning about mathematical ideas support the habits of mind that *ALL* students need to develop to meet mathematical practice and process standards. It provides various and specific strategies for you to build a discourse-rich community of learners.
- Chapter 3, *Teacher Moves That Promote Effective Student Discourse,* reminds us of the thousands of teacher decisions and pedagogical moves that we make daily in our math classrooms and how we can learn to reflect and act upon them to promote productive, healthy risk-taking, while building a discourse-rich community of mathematical learners.
- Chapter 4, *How Math Talks Promote Discourse: Arguments, Ideas, and Questions,* explores what specific teacher talk moves can be implemented during Math Talks, a daily routine, which offers equitable opportunities for all students while engaging in mathematical discourse. It answers the question: How do we begin to get our students to talk, justify, critique, and challenge each other about their mathematical thinking?
- Chapter 5, *Equity and Engagement,* continues the discussion about how our teacher beliefs and knowledge of our students impact student engagement with cognitively demanding tasks in an inclusive and safe classroom environment. We look at the strategies that will help you turn routine math problems into non-routine problems through the use of mathematical discourse; thereby, providing equity for all students.
- Chapter 6, *Getting Kids Ready to Talk! The First 20 Days of Discourse,* provides a day-by-day guide that answers the questions: How do I get my students to talk mathematically in my classroom? Where do I start? How do I fit this in with all the content that I must cover? This day-by-day guide will show both elementary and secondary teachers how to build community and establish necessary norms to create a discourse-rich environment where students take risks, justify their strategies, and question and clarify mathematical ideas all while deepening their understanding of mathematics.