

## ***Mathematical Models for Teaching: Reasoning Without Memorization,*** **by Ann Kajander and Tom Boland**

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*Reviewed by Gladys Sterenberg*

In Alberta's current political climate, we are challenged to address the needs of our stakeholders (including parents) when teaching math. The apparent conflict between teaching for understanding and teaching basic facts through rote memorization has been the focus of much debate. The authors of *Mathematical Models for Teaching: Reasoning Without Memorization* are explicit about the importance of reasoning in learning math, and they offer compelling strategies for facilitating reasoning in our classrooms.

The book is written for the classroom teacher. Ann Kajander and Tom Boland outline math concepts that are required for teaching math, and they are motivated by the need to provide comfortable experiences for teachers in order to mitigate math anxiety. Through a focus on mathematical models and manipulatives, the authors explicitly promote reasoning and sense-making over memorization. This is not what is known as discovery math but, rather, an emphasis on constructivist, inquiry and problem-based teaching strategies. What makes this book of particular interest is the Canadian context and the framing of teacher professional knowledge that relies on input from over 700 teachers who participated in the authors' research study.

The book's 15 chapters are organized by math strands that match Alberta's mathematics program of studies. It is not grade specific, but it certainly explicates math concepts relevant to K-9 classrooms. The first two chapters provide a research-based overview of the book. The subsequent chapters each focus on a specific math concept. Within each chapter is an exposition of concepts (including key terms and fundamental ideas), ideas for student explorations,

tasks, examples, ideas for follow-up and discussion, problems for teachers, and suggestions for further reading. The concepts were chosen according to what the authors consider most important for teaching mathematics.

What makes this book different from other professional resources is its focus on mathematics for teaching. This is consistent with current and emerging research on teachers' pedagogical content knowledge, which is linked to effective teaching. The authors' choice to promote models and reasoning reframes a focus on manipulatives and communication in a way that promotes deep pedagogical understanding of why models are necessary, how to use models with children, and how to engage learners in communication to prompt reasoning. The authors provide explicit direction for teachers who might not be familiar or comfortable with teaching mathematics. While the authors note that their focus is not on memorization, they do provide a strong rationale for the way skills and proficiencies result from a focus on models and reasoning. Thus, the development of basic skills is an outcome of teaching through models and reasoning, not the reverse.

I recommend this book as a resource for teacher leaders who are working with inservice and preservice teachers, to support the work in the classroom. Kajander and Boland are deliberate about providing support for student learning of mathematics. However, within this context, teachers will also learn the mathematics they are encountering in Alberta's program of studies. I believe that this book provides a way to support teachers' own understanding of mathematics as they encounter strategies to enhance their teaching of mathematics.