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# Teaching Fractions and Ratios for Understanding: Essential Content Knowledge and Instructional Strategies for Teachers

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2005 ♦ Lawrence Erlbaum ISBN: 978-0805852103 Mathematical and Pedagogical Knowledge: Books

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## DESCRIPTION

*Teaching Fractions and Ratios for Understanding: Essential Content Knowledge and Instructional Strategies for Teachers*, 2nd edition, by Susan J. Lamon, pushes readers to teach for understanding and to develop their own understanding of mathematical concepts. It asks readers to move beyond the limits of their current understanding of rational numbers, challenging them to refine and explain their thinking, without falling back to rules and procedures on which they may have previously relied. The book argues that the detrimental consequences of teaching students to merely “do” mathematics rather than to understand concepts becomes critical for students in gaining access to higher level mathematics and science.

Promising new activities and teaching methods that are outcomes of research are provided and give direction for changing instruction. An underlying assumption is that facilitating teacher understanding using the same questions and activities that may be used with children is one way to help teachers build the comfort and confidence they need to begin teaching for understanding. The goal of this book is to provide teaching methods and materials that may be used with teachers and also with students to promote the ideas and ways of thinking that lead to the development of proportional reasoning.

## STAGE 1 LEADERSHIP DEVELOPMENT

*Teaching Fractions and Ratios for Understanding: Essential Content Knowledge and Instructional Strategies for Teachers*, 2nd edition, by Susan J. Lamon, supports stage 1 development of specialists in the role of coaching working to increase their knowledge of fractions and ratios. For a specialist working to meet the Teaching and Learning principle, this book provides examples of activities and teaching methods useful in developing and modeling knowledge about improving student learning. For students needing additional support with fractions and ratios, this book will be a useful resource.

Chapter 1 gives an overview of proportional reasoning including a discussion of the components of understanding that are essential to powerful reasoning. Reasons for changing instruction are provided and include:

1. Fraction, ratio, and rational number ideas are complex and interconnected.
2. Many students have a limited understanding of the various meanings of fraction representations.
3. Instruction needs to actively facilitate thinking leading to proportional reasoning.
4. Long-term studies show that instruction can be improved.

Chapters 2 through 15 address specific topics related to fractions and ratios and include children's strategies, activities to try, and reflection questions that are useful for personal reflection and as starting conversations with colleagues about the development of proportional reasoning. For those interested in further resources, a supplement called *More: In-Depth Discussion of the Reasoning Activities in "Teaching Fractions and Ratios for Understanding"* is available. More than an answer key, it provides additional discussion of the issues along with teaching problems that may be useful for assessment purposes.

## STAGE 2 LEADERSHIP DEVELOPMENT

*Teaching Fractions and Ratios for Understanding: Essential Content Knowledge and Instructional Strategies for Teachers*, 2nd edition, by Susan J. Lamon, supports stage 2 development of leaders working to implement research-informed best practices. Unlike a textbook that provides formal theory, this book uses problems and activities that will become valuable resources for use in elementary and middle school classrooms. Facilitating a group of thoughtful practitioners working through the problems and reflecting on the discussions in the book will help them to deepen their own understanding of fractions and ratios. The methods and activities have been tested with students from grades 3 through 8 and provide ideas for use in participants' classrooms. Some of the ways the book has been used include:

- Mathematics or mathematics methods courses for pre-service elementary teachers: This book provides enough material for a three-credit, fifteen-week course.
- Integrated mathematics and mathematics methods course: Participants might study a chapter a week, work and discuss all of the problems, and then videotape and analyze interviews with students solving the same problems.
- In-service courses: Several chapters might be introduced in a two-week summer seminar and then throughout the year chapters might be discussed during in-service days.

Regardless of how the facilitator uses the book, it is important to provide time for personal problem solving and reflection and then time to work with others. Abundant discussion of the activities and sharing of explanations, strategies, and solutions are critical to the success of the activity.