Introduction

Research and Standards

Research suggests that many students "find the rational-number system to be very difficult. Introduced in early elementary school, this number system requires that students reformulate their concept of number in a major way. They must go beyond whole-number ideas, in which a number expresses a fixed quantity, to understand numbers that are expressed in relationship to other numbers. These new proportional relationships are grounded in multiplicative reasoning that is quite different from the additive reasoning that characterizes whole numbers" (Board on Behavioral, Cognitive, and Sensory Sciences and Education [BCSSE], 2005).

Students find the transition from whole-number reasoning and concepts to rational numbers frustrating. They try to apply the rules and concepts of whole numbers to rational numbers. For many students, "the introduction of rational numbers constitutes a major stumbling block in children's mathematical development. It marks the time when many students face the new and disheartening realization that they no longer understand what is going on in their mathematics classes. This failure is a cause for concern" (BCSSE, 2005). Students have to learn that "a rational number can be expressed in different ways—as a decimal, fraction, and percent. To further complicate matters … a rational-number quantity can be represented by an infinite number of equivalent common and decimal fractions" (BCSSE, 2005).

To avoid frustration and to ensure students' success, *Basic Math Practice: Fractions, Decimals, and Percents* is designed to promote mastery in developing an awareness and understanding of the interconnections among fractions, decimals, and percents. Activities provide students with multiple forms of visual representations of fractions, decimals, and percents. Students have higher levels of success with fractions, decimals, and percents when they are applied in relevant, real-world situations. Research shows that "students need more problem-solving experiences where rational-number concepts, for example, can be applied to realistic contexts" (Woodward, Baxter, & Robinson, 1999). Multiple activities in this book incorporate problem-solving skills through real-world applications. Rational numbers pervade our daily lives; therefore, students must be able to understand them for academic success, as well as for future employment and life skills.

Introduction

This book meets both state and national standards (including the National Council of Teachers of Mathematics Standards 2000 Project) regarding data, analysis, representations, and connections. As students complete the activities in this book, they will:

- recognize and generate equivalent forms of commonly used fractions, decimals, and percents.
- compare and order fractions, decimals, and percents efficiently.
- convert and manipulate fractions, decimals, and percents to solve problems.
- recognize equivalent representations of the same number.
- understand the meaning and effects of arithmetic operations with fractions, decimals, and percents.

Board on Behavioral, Cognitive, and Sensory Sciences and Education. (2005). *How students learn: Mathematics in the classroom.* (M. S. Donovan & J. D. Bransford, Eds.) Washington, D.C.: National Academies Press. Retrieved August 2, 2005, from http://www.nap.edu/books/0309089492/html/

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* Reston, VA: Author.

Woodward, J., Baxter, J., & Robinson, R. (1999). Rules and reasons: Decimal instruction for academically low achieving students. *Learning Disabilities Research and Practice, 14*(1), 15–24. Retrieved August 4, 2005, from http://www2.ups.edu/faculty/woodward/Rules.pdf