



Each Number in Its Place: Teaching Place Value to First Graders

Guide for Curriculum Unit 08.05.01, published September 2008

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This unit seeks to give first grade students a robust beginning to their study of arithmetic through a stronger understanding of place value. The focus of the unit will be understanding ones, tens, and hundreds, their relative sizes, and how they are used to express any number up to 100.

The key ideas of the unit are adapted from the Singapore mathematics program. This curriculum has attracted considerable attention in recent years because of Singapore's consistent first place finishes in the TIMSS (Trends in Mathematics and Science Study) international comparison of mathematics achievement. The unit seeks to bring the insights of the Singapore program to a typical American first grade classroom.

The first main goal of the unit is to achieve strong mastery of the addition and subtraction within 10. This is facilitated by the idea of *number bonds*, in which three numbers are related by addition: for example (3, 4 and 7) form a number bond. The number bond is a more tangible analog of the fact family. When addition and subtraction within 10 is solidly in place, the rest of the addition and subtraction facts are learned via the process of "making and unmaking 10". This provides a principled way to learn the addition facts, and couples it with a beginning of learning place value.

The next stage is to learn to think of two digit numbers as combinations of some tens and some ones. This is combined with addition and subtraction, first without regrouping, and then with. This will include understanding that the tens always account for most of the number, and that, in comparing two numbers, the number of tens is decisive. The unit will culminate, on the hundredth day of class, with the understanding that 100 consists of 10 tens, and makes a new, larger unit that will allow us to deal with yet larger numbers.

(Developed for Math, grade 1; recommended for Math, grade 1)

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