A TEACHER REFLECTS

The parallel investigations in Lessons 16 and 19, in which students determined whether the answer to a division or multiplication problem would be less or greater than the "first number" in the problem, were extremely helpful. I often find, when teaching multiplication of fractions, that students can easily grasp the algorithm, but have little sense of what is going on with the numbers. They are accustomed to seeing multiplication always produce a result greater than both factors and are often surprised that multiplying by a fraction can produce a lesser result. Even more difficult to comprehend is that dividing a number by a fraction yields a greater result. I have many times had students assume their answers were wrong because they were incompatible with their idea of what should happen when multiplying and dividing. I also took the time to have small groups of students work together to draw a model of a multiplication and division problem using the same numbers in each. Each group took a turn at the board to show why the solutions to their problems were true. Their drawings helped increase a class-wide understanding of the computation involved.

Similarly, the two estimation lessons reinforced an intuitive understanding of multiplication and division of fractions. It is so important for students to have a ballpark idea of an answer, yet rarely do students stop to decide whether their answer makes sense for the problem. After playing each estimation game I asked my students what skills they were using to "find the best estimate." One student pointed out that "If a number is close to a whole number you can just multiply by the whole number." Another student mentioned that "If you have a fraction like $\frac{4}{9}$ you know it's about a half."

The game in Lesson 20 was an excellent way to pull together the students' understanding of, and ability to estimate, fraction products and quotients. To play the game, students had to know what effect the first number in a problem would have on the second number, both in multiplying the two numbers and in dividing the first number by the second. Since sixth graders are great competitors, the game provided the motivation that some still needed to acquire this skill. By popular demand, we have now played the game several times.