*In this lesson, Marilyn Burns shows fifth-grade students a fraction and they decide if it's more or less than one-half and then explain their reasoning. This focus on one-half helps establish it as an important and useful benchmark. The lesson also provides practice with mental computation of whole numbers as students compare numerators and denominators.* More or Less Than One-Half *will appear in Marilyn's forthcoming book* Teaching Arithmetic: Lessons for Introducing Fractions, Grades 4–5, *to be published in fall 2001 by Math Solutions Publications.*

I used this activity when I had some time left at the end of a period or as a warmup at the beginning of class. I'd write a fraction on the board and ask if it was more or less than one-half. Students who answered also had to explain their thinking. After each student's response, I'd ask, "Does anyone have another way to explain that?" In this way, students focused not only on answering and explaining their reasoning but also on trying to think of different ways to explain answers. I'd continue discussing the fraction until all students who wanted had had a chance to explain.

Here's how the activity went with a class of fifth graders in the fall of the year. I wrote on the board:

2/3

"Is this more or less than one-half?" I asked.

Davy began by saying, "There are three thirds in a whole, and two-thirds is more than halfway to the whole."

"How do you know it's more than halfway?" I probed. Davy wasn't sure.

"Listen to other ideas," I said, "and see if they can help you explain more." I called on Ramon next.

"On a measuring cup, the line for two-thirds is above the one-half line," Ramon said. "It's like halfway to a whole cup after half a cup."

Leslie asked to come to the board. She drew a circle and divided it into three equal-size wedges. She said, "If you had a cookie cut into thirds like this, you can see that one-third is less than one-half. If there were two people and you each took one-third, then you'd have to share some more to get one-half each. So one-half is one-third plus some more."

Rachel's explanation was more abstract. "If two-thirds was the same as one-half, then two would have to be half of three. But it's more, so two-thirds has to be more."

One day, I chose one and one-quarter for the fraction. When I wrote it on the board, some students laughed and others blurted out comments: "Simple!" "That's easy." "No-brainer." Practically every student raised a hand.

"More or less?" I asked. "Let's all say the answer softly together." That took care of the answer.

"Who can explain why one and a fourth is more than one-half?" I then asked. Again, there were lots of volunteers.

"It's obvious," Daniel said, "because one-half is less than one and one and one fourth is more than one, so it has to be more than one-half."

"It's more than twice as big," Sadie said, "because one-half and one-half are one and one and a fourth is even more than that."

"On the number line, they're on different sides of one," Emma said. "That shows one-half is less."

Even for an obvious solution, students may think in different ways. Listening to their thinking often gives me new insights into students' understanding. Also, sometimes students think in ways I hadn't thought of, giving me new ways to look at the mathematics.

For this activity, I sometimes selected fractions with larger numerators and denominators, at times choosing fractions that were easy to analyze, such as 61/100 or 400/1000, but at other times choosing fractions that also offered a mental computation challenge, such as 127/260, 89/180, even 267/498. The students seemed to like stretching their thinking to decide if fractions like these were more or less than one-half.