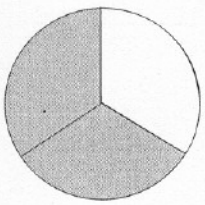
Six-Tenths or Four-Fifths of a Dollar?

The math experiences of the 30 students in my fourth-grade class vary widely. Esmarelda, a recent immigrant to the United States, is Limited English Proficient (LEP) and has never had formal schooling. Chris is a gifted student who enjoys calculations and problem solving. Michael participates in my class, then later in the day goes to the resource room for additional math help. There are also 3 children with special needs, 4 other LEP students, and 12 extremely economically disadvantaged students.

Often, it seems, I teach a lesson 4 or 5 times before I feel comfortable moving ahead. Sometimes I worry that I'm beating a dead horse. For those students who catch on quickly I try to plan enrichment activities or set up activity centers. This year—my third year of teaching—I've been trying to include more math journal writing before, during, and after lessons. I also try to use concrete materials before explaining a mathematical concept to the class.

I recently introduced the class to fractions. They have learned how to identify fractions using diagrams such as the following:



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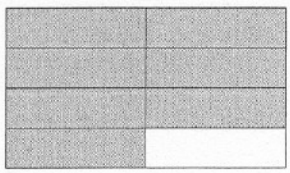

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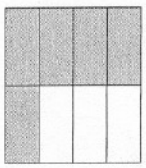

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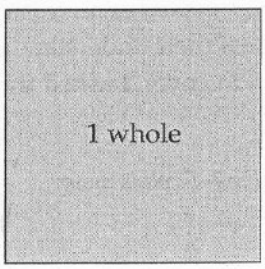
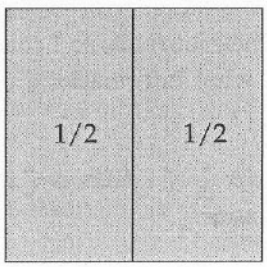
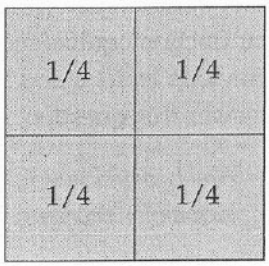
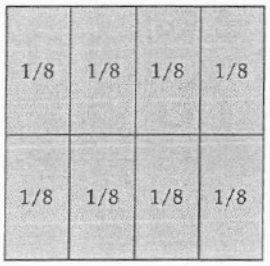
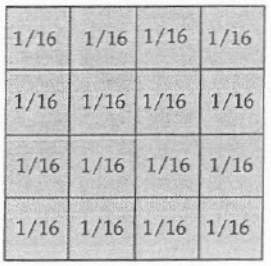
Each student made a fraction kit that allowed them to show and identify various fractions. The denominators of the fractions in the kits were 1, 2, 4, 8, and 16.







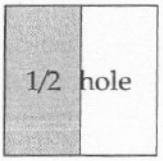




My beginning lesson had focused on identifying and orally naming various fractions.

"Place your 'whole' on the desk top," I said. "Show me $\frac{1}{4}$ of a whole by placing $\frac{1}{4}$ on top of it." The students responded by placing a "one-fourth" piece on the square representing 1 whole.

By the end of the lesson, they could successfully name and use the fraction kit to show unit fractions like $\frac{1}{2}$ or $\frac{1}{8}$ and nonunit fractions like $\frac{3}{4}$ or $\frac{5}{8}$.



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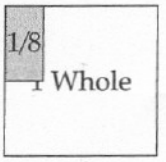

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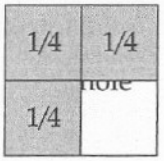

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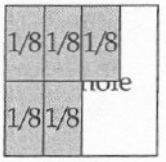

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The next lesson focused on equivalent fractions. I asked the students to figure out the answer to questions like how many eighths would be equal to $\frac{1}{4}$ or how many sixteenths would equal $\frac{3}{8}$. They used their fraction-kit pieces to determine the answers. By the end of this lesson, students were very familiar with the relationship among the fraction pieces and could solve simple equivalency problems without using the pieces.

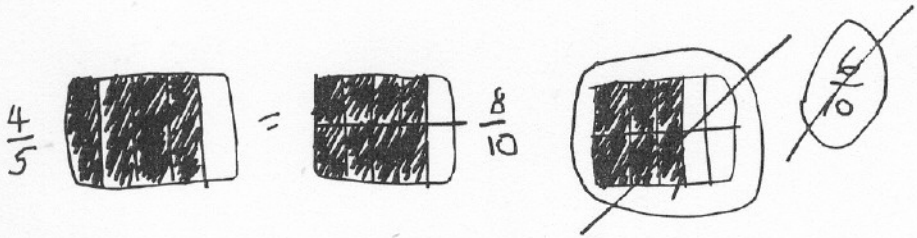
I was then ready to have students learn how to compare fractions that have different denominators and numerators. Prior to beginning, I asked them to write about fraction equivalency in their journals, so I could assess their understanding of previous lessons and know what information I needed to cover. I asked them to answer this question:

> *Which would you rather have: $\frac{6}{10}$ of a dollar or $\frac{4}{5}$ of a dollar? Explain your reasons for choosing your answer.*

After reflecting, the students picked up their pencils and wrote.

Cindy's journal read: "If I had $\frac{6}{10}$, I would have 2 more than $\frac{4}{5}$. I would choose $\frac{6}{10}$ so I could have more money."

Chris wrote: "$\frac{4}{5} = \frac{8}{10}$. $\frac{8}{10}$ is greater than $\frac{6}{10}$. Of course, I'd take $\frac{4}{5}$ of a dollar. Wouldn't you?" He included an illustration:



Esmarelda wrote: "No sé. $\frac{6}{10}$ es mas grande."

Nikki drew a picture to accompany her answer: "I want $\frac{6}{10}$. It is bigger."

Only 4 of the 30 students wrote $\frac{4}{5}$. Their journals gave me some hints about how they were thinking about fractions, but I was not sure how to use this information to plan our future work. Since the students were familiar with the fraction kit, I wondered if they would have answered differently if the question had been, "Would you rather have $\frac{3}{4}$ or $\frac{5}{8}$ of a chocolate bar?"

Suggested Reading

Behr, M. J., T. R. Post, and I. Wachsmuth. 1986. "Estimation and Children's Concept of Rational Number Size." In *Estimation and Mental Computation*, edited by H. L. Schoen and M. J. Zweng, 103–111. Reston, VA: The National Council of Teachers of Mathematics.

Cuevas, G. 1990. "Increasing the Achievement and Participation of Language Minority Students in Mathematics Education." In *Teaching and Learning Mathematics in the 1990s*, edited by T. J. Cooney and C. R. Hirsch, 159–165. Reston, VA: The National Council of Teachers of Mathematics.