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HOUGHTON MIFFLIN HARCOURT
MATH Expressions

“U.S. curriculum is like a buffet, don’t even think about eating everything or you’ll be sick” - Akihiko Takahashi

- Curriculum: Make decisions about unit design to maximize student learning based on math standards, the big mathematical idea of the unit, research, and learning progressions.
- Lesson Design: Design a lesson using problem solving structures to build conceptual understanding.
- The Math: Develop an understanding of equivalent

The Research Lesson - Boardwork

The Problem: Does one of these two sets of squares have more area than the other? Can you shade an equivalent fraction to $\frac{1}{3}$ and $\frac{2}{6}$ in the next square?

Student 1: I think the one with 6 pieces is bigger because it has 6 pieces and that's more than 3 pieces.

Student 2: The 3 pieces is the same as the 6 pieces because they take up the same area.

Student 3: $\frac{1}{3}$ is equivalent to $\frac{2}{6}$ because the 6 pieces are smaller but there are more pieces.

Summary: To make an equivalent fraction you can break a fraction into smaller pieces and use more of them. A fraction can have more than one equivalent fraction. Can you think of any other fractions that are equivalent to $\frac{1}{3}$?

One student creates eighths from the fourths to find equivalent fractions. Yes!

Students work collaboratively to determine which has a greater shaded area.

Our Learning:

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Curriculum: Take the time to deeply understand the standards and progressions so that you know what to emphasize, what to skip, and understand how ideas build.

Lesson Design: You don’t have to do everything in the lesson. Choose one juicy problem and release the authority to the students. Trust them to engage in mathematical thinking, and don’t over scaffold. Anticipating their responses helps you sequence student responses and move towards the learning goal.

The Math: The algorithm for finding equivalent fractions should be derived from student thinking and connected to a visual representation. This takes time, you need to build from a third grade understanding to fourth grade.

Some Outcomes

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- Update unit planning guide to support teachers in making decisions about unit progression based on key math ideas
- Create a lesson planning template for Math Expressions that aids teacher decision making
- Make recommendations for 4th grade unit 7 in core curriculum