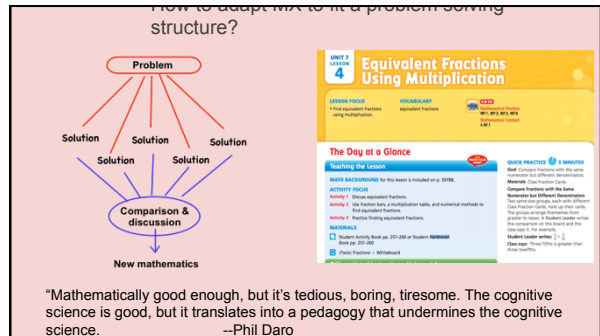


Seeking a Deeper Understanding: Lessons Learned from Lesson Study

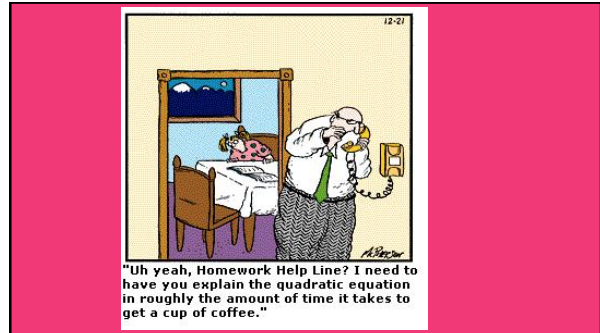
Oakland Unified School District
Elementary Mathematics Team Inquiry
Oakland, CA
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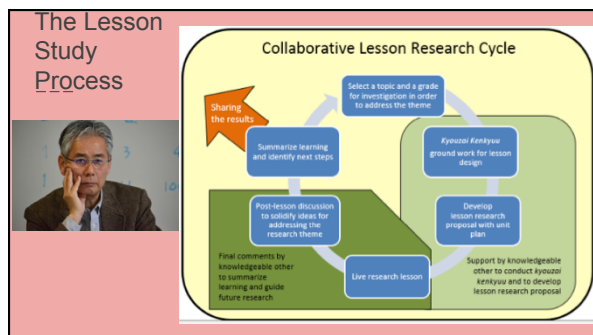


Grade 5 Unit 8: Measurement and Geometry			
Unit Overview	Grade Level	Unit Length	
Unit of Study: Measurement and Geometry Math Expressions by theme: 1. Measurement and Data 2. Area and Volume Topics: 1. Classify geometric figures. Big Idea: Objects can be assigned a number of units within a measurement system, and each system has its own conversion rates. Two sets of these measurement figures can be described, identified, and analyzed to those properties. Essential Question: How can we convert among different units of measurement within a given system? How do you measure the volume of a rectangular prism? How do we classify two-dimensional figures in a hierarchy based on properties? Unit Resources: Math Expressions (ME), Mathematics Resource Services (MRS), Georgia Department of Education, and Triad-based Unit Materials: ME MathHubcard, ME geometry poster, ME color, ME Classification and Triangle cards, ME Student Activity books, ME Activity Cards Unit Design: Overview, Student uses, goboards, grid paper, manipulatives like, markers, tape measures, colored pencils, poster paper, scissors, construction paper, rulers, compass, string/string, glue, highlighters, and hole punch.	5	29 days	
Unit Key Experiences: Entry Task: "Measurement Madness" Lesson Series 1: 3 days Lesson Series 2: 2 days Lesson Series 3: 2 days Lesson Series 4: 2 days Lesson Series 5: 2 days Lesson Series 6: 2 days Lesson Series 7: 2 days Summative Task: "Circumference and Area Assessment" excluding Performance Task "Logic of Figures"			



The Dilemma:
How can we support elementary teachers and teams in adapting our existing Board adopted curriculum to be more student-centered, problem solving focused, cognitively demanding, and as such, build ownership in alignment with our Vision for





Kyozai Kenkyuu

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 small squares have more area than the other?

Can you write an equivalent fraction to $\frac{3}{4}$ and $\frac{6}{8}$ 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.

How do I see on the number line?

$\frac{3}{4}$ is equivalent to $\frac{6}{8}$ because they take up the same area.

Student 2:

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

$\frac{3}{4}$ is equivalent to $\frac{6}{8}$ because they take up the same area.

Student 3:

$\frac{3}{4}$ is equivalent to $\frac{6}{8}$ because they take up the same area.

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 $\frac{3}{4}$?

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:

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

- 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