

Mathematical Models That Make Sense

(and promote conceptual understanding that develops procedural fluency)

I know you've heard it, too.
"These kids just don't know their facts."

And I bet you've seen it.

$$\begin{array}{r} 24 \\ \times 12 \\ \hline 48 \\ 24 \\ \hline 72 \end{array}$$

The problem? We have omitted the "sense-making" component from our math classes. We have created students who are unable to determine reasonable answers. We have created a culture of students (teachers?) who believe that procedure IS mathematics. And it is joyless.

I sure didn't discover the joy in mathematics until long into my teaching career. I didn't realize that numbers were relational, and that Number Sense meant just that. I didn't realize that math was visual, tangible, kinesthetic, and social. I hadn't witnessed the passionate fourth-grader defending her method as if defending the Constitution. So I am learning.

When given the opportunity, it seems kids solve problems in ways that make sense to them. They draw pictures. They make collections. They move around and talk. They make tables and charts. If the problem is intriguing, they find a way to make sense of it. They persevere.

Kids often create their own models and methods. Some are more efficient than others. Some are more easily generalized than others. The Common Core Standards for Mathematical Practice, specifically standard 8, guide us toward efficiency as we "look for and express regularity in repeated reasoning."

This workshop focuses on guiding students toward the use of three visual models that lend themselves to efficiency while enhancing sense-making. In other words, these models can be used to represent current student thinking and they can be used as vehicles to challenge students to extend their thinking. The models we will examine are: Number Line and Open Number Line, Area Model, and the Ratio Table.

Ultimately, our objective is to promote conceptual understanding to the degree that procedural fluency is a natural outgrowth of the process. We'll have a little fun along the way.

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