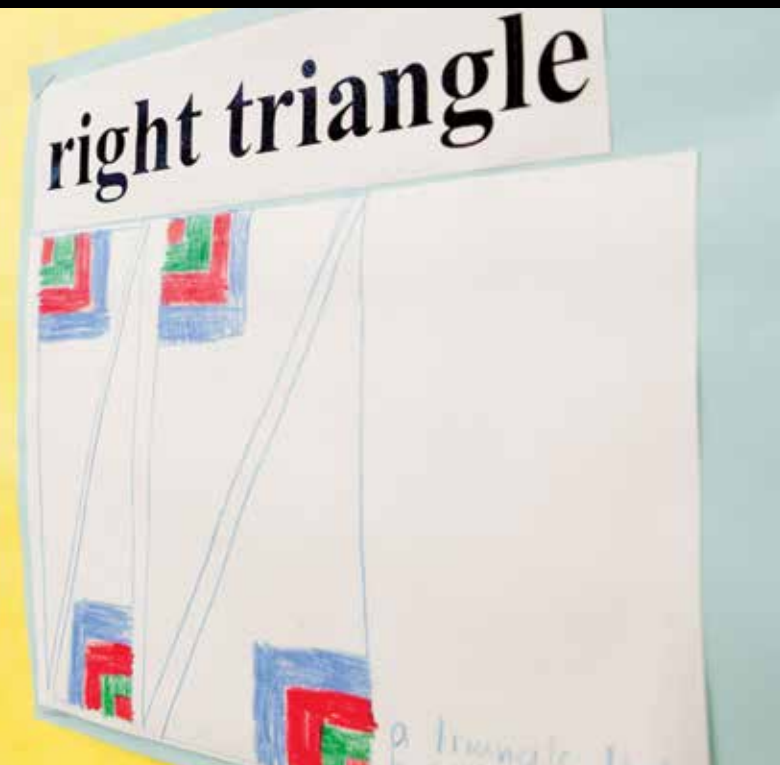




# The New Equation for Teaching Math

A Q&A with master math teacher Susan O'Connell



## What is your background as an elementary educator? How did you come to specialize in mathematics?

I began as an elementary school teacher and taught all subject areas. Although I had a Reading Specialist certification, I grew to love teaching mathematics. When the opportunity arose to join a graduate program to develop mathematics teacher leaders in my school district, I jumped at it, and I have been immersed in teaching mathematics ever since. I've worked at the school, district, and university levels supporting classroom teachers as they work to enhance their math teaching skills.

## What are some key big ideas in math teaching? How has math teaching changed since you started becoming active in the field?

The focus of mathematics was predominantly computations when I began my teaching career, but has been evolving ever since. The changes in the past couple of decades have been staggering. We have finally realized that math is not just about memorizing ways to get right answers.

Early on, I became interested in teaching problem solving to my students and quickly began to recognize the importance of getting students talking about and visualizing math problems. The need for strong teacher questioning also quickly became apparent. By using objects and drawings and talking about the math ideas, my students began to understand the math they were doing.

Today, our focus is on so much more than computations. Our goal is to help our students think mathematically and be able to use the mathematics they learn. It is about understanding and application rather than just about computations.

## Many elementary teachers say they're more comfortable teaching reading than math. What connections do you see between these disciplines and how teachers can approach them?

There are so many connections! Strong teachers of reading use a variety of instructional strategies that they can also use in mathematics. In reading, our focus is not just on phonics and sight words, it is on teaching students to comprehend. In math, our focus is not just on math facts and algorithms, it is on teaching students to apply and solve problems. In both content areas, we balance instruction to include foundational skills (phonics or math facts) and thinking skills (comprehension or problem solving).

The ability to solve equations (computational skills) does not mean you can solve problems. I found that many students lacked problem comprehension, but as I adapted the techniques used in reading instruction, I watched students gain insights. I asked students to retell and visualize the problem situation, identify important information from the problem, and visualize the situation with objects and drawings. I asked them to justify why they chose certain operations to solve the problems and to explain the equations they built to show the problem situation. I used think-alouds and posed focused questions. I asked students to talk about how they solved problems and to explain the decisions they made throughout the process. I realized that I was teaching reading comprehension.

## What about writing? What role does writing play in math, and what connections do you see between the teaching of these two topics?

Writing about mathematics supports our students in math the same way as in other content areas. As we write, we organize and process our ideas, and we rethink and strengthen our understandings. And our students' writing offers us a glimpse into their understanding and math skills. We see what they get and what they don't get, and those insights help us plan meaningful instruction.

In mathematics, just like in other content areas, we write for a variety of purposes. In math, we use procedural writing to explain how we solve a problem, employ descriptive writing to describe concepts like symmetry or place value, compose justifications to defend our strategies or solutions, and summarize big ideas we have discovered from our observations and investigations with numbers.

Asking students to tell us in writing how they solved a problem and why that strategy worked for them focuses them on process rather than answers. Asking students to share their insights about the patterns they see in multiplication facts or their understanding of what makes a rectangle a rectangle challenges our students to think more deeply about math concepts.

Writing is a tool to explore ideas, share ideas, and, ultimately, build understanding. It is as useful in mathematics as any content area and aligns with our new classroom focus that is centered on understanding and application.

## Do you have any final thoughts on teaching K-5 math?

We want to help all of our students understand the big ideas of math and feel confident in their math abilities so they are prepared for the more complex tasks they will face in middle and high school. Through math talk, visualizations, investigations, and observations, our students build skills based on understanding rather than simply memorizing facts and procedures that they don't understand. And with understanding comes confidence and positive attitudes about math!



**Susan O'Connell is a well-known and in-demand math consultant and Heinemann author. Among Susan's many titles are *Now I Get it: Strategies for Building Confident and Competent***

*Mathematicians, Introduction to Communication, Mastering the Basic Math Facts in Addition and Subtraction, Mastering the Basic Math Facts in Multiplication and Division, and her latest book, Putting the Practices into Action: Implementing the Common Core Standards for Mathematical Practice.* She has worked at the school, district, and university levels, helping teachers to enhance their math teaching skills. Susan also conducts popular and informative math workshops nationwide.

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