

New Math Curriculum

In 2014, Indiana adopted new academic standards in mathematics. These standards reflect a shift in math education that is occurring across the country. We will share information in upcoming newsletters to help you understand what the new standards ask your child to know and be able to do as well as how you can help them at home. This month, we are sharing an excerpt from the book, *A Parent's Guide to Understanding Math Education in Today's Schools* by Cathrine Kellison and Cathy Fosnot (2012).

Classrooms today often look different than what we remember. How can we help our children succeed when the goals of instruction seem so different from what we experienced? This is especially true in math. Today the focus is more on conceptual *understanding*. Most of us probably experienced math lessons where teachers focused on *procedures* and we practiced them. We may be able to do arithmetic with pencil and paper quite well, but do we truly understand why the procedures work? Are we competent in estimating, seeing patterns, problem solving, and using mental math strategies to compute?

Math Education today...

- **Encourages students** to explore why procedures work and to find various strategies for solving a problem and to examine each strategy for its efficiency.
- **Allows teachers** to work more closely with students, one-on one and in groups, discussing and questioning and refining their strategies.
- **Supports students** to work collaboratively with one another, in pairs and groups, to look at options, and to exchange ideas and develop ways to communicate and defend their ideas.
- **Supports children to persevere in solving problems** and to appreciate puzzlement and the fun of “cracking” a problem.
- **Makes the mathematical connection** between the classroom ideas and the real world in which children and their teachers and families live and work.
- **Emphasizes clever mental math computation** and focuses to a lesser degree on pencil and paper arithmetic strategies.
- **Encourages children to model problems**, for example with arrays, ratio tables, and number lines.

In classrooms today, children are being challenged to think, to wonder, to explore, to pose and solve problems about their real world, to craft arguments to defend their thinking, and to use mental math strategies. They are being encouraged to be young mathematicians at work!

Traditionally, arithmetic was often taught as if there was “just one way to do it.”

Teachers would explain the procedure (like adding and carrying over, or long division) and students would practice it, trying to grasp what the teacher was explaining. Learners were rarely allowed to take the numbers apart in their own ways. Yet, problem solving and playing with number relationships are at the *heart* of what mathematicians do.

Doing mathematics can be like solving a mystery. Math is exciting and creative, and it's also very personal. Each mathematician looks at a problem differently. He or she examines a range of strategies for efficiency, elegance, and ability to model and solve the problem – and others like it.

They write up their solutions and proofs to convince each other. Even computation is done creatively. Anne Dowker (1992), a researcher at the University of Oxford, examined the computation strategies of 44 professional mathematicians and found that they used the standard strategies we learned and practiced in school only about 4% of the time when they did arithmetic! Mostly they pulled the numbers apart and used creative mental math strategies. They tinkered with the numbers and they found this “tinkering” fun! Rarely did elementary schooling provide us with opportunities like this - to really *do* mathematics. Usually it was about doing the teacher's problem in the teacher's way. And when the teacher's way didn't make sense, math anxiety was the result.