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5 Ways To Help Your Kid Not Stink At Math

By Elizabeth Green

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In “Why Do Americans Stink at Math” for this week’s edition of the magazine, I wrote about the latest wave of math reforms, which are both the best chance we have of curing our national “innumeracy” (the mathematical equivalent of not being able to read), and a near guarantee at driving children and their parents understandably insane. As I write in the story, the problem is not the new approach itself. The problem is our widespread failure to help teachers figure out how to teach in the new way.

While we wait for teachers to get the help they need, though, families will still be left with the frustrating task of monitoring homework time. What can parents do to help their children extract all the best from the new math — and minimize suffering from the worst? With the right attitude, and these tips, it might just be possible for you and your children to not only survive, but thrive.

1. Listen to What’s Going Wrong

Teaching children math requires first figuring out what they don’t understand. Instead of getting to the heart of a misunderstanding, we are far more likely to tell children something like, “No, that’s not right, try it this way instead.” The better response to a wrong answer begins with asking the child to explain her thinking.

For example, take a simple problem like 49×5 . Many children will incorrectly write the answer as 405, and great math teachers know why. They have used the correct algorithm, lining up the numbers, carrying the 4, etc. But they have them in the wrong order, first adding 4 to 4 to get 8 and then multiplying the product by 5 to get 40, instead of multiplying 5×4 to get 20 and then adding 4 to get 24. Seeing this deeper misunderstanding in a child’s wrong answer allows you to combat it, showing the child not only the right steps, but why the wrong ones don’t make sense.

2. Do Everyday Math Out Loud

Many people use math in their jobs without realizing it. Dairy factory workers use it to figure out how to pack quarts of milk efficiently onto trucks; cashiers use it to make change and calculate prices; even those of us who are customers have to think about how to calculate a tip, compare prices and confirm we've gotten the right amount of change.

Math is not a disconnected process but a manipulation of real numbers that exist in the real world and make real sense. If you open up these everyday problems for your kids to think through with you, you won't just be helping them to see how math makes sense in the real world. You can also get some help figuring out the tip.

3. Reclaim the Dreaded Dots.

One of the math exercises giving parents indigestion these days is the idea of asking children to draw and count dots in order to solve addition and multiplication problems. Motoko Rich recently reported for the Times on a couple vexed by "the pictures, dots and sheer number of steps needed to solve some problems." Without any sense of why these exercises matter, they can be tedious.

But drawing dots can also help children think more deeply about math. The trick is not just to have them draw, but to think. In a response to Ms. Rich's piece, Christopher Danielson, a math teacher as well as a parent, described how he used "arrays," the structure the dots are supposed to get kids thinking about, to help his 7-year-old daughter understand multiplication.

First he asked her to draw three rows of five dots, paying attention to how she counted out the total — probably counting by fives, he realized. Then he asked, "What if it had been 3 rows of 6?" After what Mr. Danielson described as a "long, thoughtful pause," his daughter announced her answer: "Eighteen!" He followed up with the key question parents should marshal as much as possible: "How did you know that?" As Mr. Danielson describes, the resulting conversation took only a minute, but helped his daughter see some key ideas about multiplication and math in general:

The three rows of five she drew gave us a jumping off point for imagining the three rows of six we discussed. Three groups of five now has a relationship for her to three groups of six.

More importantly, the strategy of finding new facts based on old facts (here that 3 groups of 6 is 18 based on knowing that 3 groups of 5 is 15), has been introduced explicitly. It is something we will talk about in the future, and something she will know to consider.

4. Combine Memorization With Understanding

When I was in 3rd grade, my father was horrified to go to a meeting with my elementary school's new principal and hear her announce that our school would no longer be teaching "math facts." To promote understanding, my dad recalls the principal saying, she'd ask teachers to focus only on concepts, not memorization.

My old principal's idea is a common misunderstanding of math reforms. Back then, in the early 1990s, just as today with the Common Core, the idea is not to replace memorization with "understanding" but to make each one stronger by teaching both at once. (In addition to arrays, the Common Core mandates that students demonstrate fluency with basic times tables and addition facts.)

My dad's response to my principal was good, but could have been even better. He decided that if the school wasn't going to teach me math facts, he was. As a result, we spent our car trips with my dad grilling me on times tables. 3×3 ? 6×7 ? Like many children, I didn't hate this exercise; I liked memorizing, and I liked the rock-music math-for-kids audiotapes my mom bought to supplement our drills.

But my math facts knowledge only took me so far. I still mostly think about multiplication as pure memorization, rather than an operation on numbers that really makes sense. Magdalene Lampert, a former math teacher who now teaches educators how to train teachers, taught me an activity my dad might have added to his repertoire to combat this phenomenon: choral counting — that is, counting by 3s, 4s, $3/4$ s, (think Schoolhouse Rock) or even larger numbers, or getting more complicated by going backward instead of forward, for example. The exercise helps

children see that multiplication is truly only repeated addition, and it also helps them see patterns in numbers, making multiplication something to memorize and to understand.

5. Introduce Big Ideas Early

After coming across so many great ideas about math teaching in research papers, I started to wonder whether parents could take them up on their own with their kids. So I decided to give one set of books — including “Children’s Mathematics” by the education professor Thomas Carpenter — to a friend with a young son.

I wasn’t sure how useful the books would be; they are written more for teachers than for parents. Also, the books aim to do something very ambitious: help elementary school children begin to learn algebra’s building blocks, starting with addition and multiplication problems. For example, instead of simply asking a child what $3 + 4$ equals, Carpenter encourages teachers to ask them $3 +$ what number equals 7. “What number,” of course, is the first step to imagining variables like “x.”

The same idea exists in the Common Core, which replaces “what number” with empty boxes that children are supposed to fill in.

It’s a great idea, but hard to carry out in practice. So I wasn’t sure what my friend would make of it, not to mention what his 4-year-old would think. Then he sent me this email:

I tried the first lesson in the book out on him tonight at dinner: combining arithmetic with algebra. I said, OK, 2 plus 2 equals 1 plus what? At first he got confused, like what does *what* mean? But then he got it and thought for a while and said, 3! (Actually, “free.” He has trouble pronouncing “th.”) We got all the way up to 3 plus 3 equals 2 plus what. Nailed that one too. So proud.

Taking that next step deeper into understanding is one of the most underappreciated goals of the Common Core. When that kind of teaching becomes

standard in the classroom, we'll see real gains in math understanding. In the meantime, parents will have to do our best to embrace the best of the "new math" at home.

Read more about math and education on Motherlode: Goodnight, Moon. Goodnight, Math Problem., and In Defense of Algebra.

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