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Interview with Greg Tang (Summer 08)

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Children's book author and "math nut" Greg Tang has generously offered his time to train volunteers of Boston Partners in Education strategies and skills for understanding the way students are learning math in the Boston Public Schools (BPS). Greg Tang is the author of books such as The Grapes of Math, Math Appeal, and The Best of Times, as well as an author for Houghton Mifflin Harcourt's new textbook program and the creator of a line of teaching materials that includes flash cards, math games, and workbooks. Mr. Tang is also a father and lives in the Boston area.

What was your own experience like learning math in school?

Math always came easy to me because I don't have a good memory! Whenever a teacher told me to memorize something, I wouldn't even try. Instead I'd figure out how to make the numbers so easy that I could calculate what I needed to know quickly in my head. It turns out that being good at breaking down numbers and problems into more manageable pieces is the key to being good at math.

Did you have people in your life who influenced your love of math? If so, who were they and how did they influence you?

My mother definitely had the greatest influence on me. She would play games with me and my two sisters - hearts, blackjack, bridge, Chinese checkers, go, chess - basically anything that required strategies. The result was that I became good at thinking ahead, which I now realize is one of the keys to teaching kids to think abstractly. Today the focus is always on seeing everything - pictures, visuals, manipulatives - basically anything to make concepts more concrete. But ironically, this may be exactly the wrong thing to be doing! It's good at the beginning, but over time it's teaching kids to be too concrete in their thinking, when they really need to be just the opposite - more abstract. By playing games like chess where you have to think many steps ahead, I became good at visualizing with my mind rather than with my eyes. So my mom's instincts were great - she taught my sisters and me important thinking skills by simply playing games with us.

How did you begin to write children's books with a problem solving focus?

It seems like the math community is always talking about computational skills and problem-solving skills as if they're unrelated and taught separately. I've always viewed them as one and the same skill. Anybody who is a good problem-solver will apply their problem-solving strategies to computations to make them easier! So in my books, I set out to teach both at the same time. My problems give kids computational practice, and at the same time, there are always important problem-solving strategies which will make these computations easier.

What motivates you to want to work with others - teachers and volunteers - to share your knowledge about math?

Basically we're all in this together, We all have a common interest in helping kids. I don't have the patience to be in a classroom every day. In fact, I can't think of a more difficult job than being a teacher... I try to do my part by helping them as much as I can. To be honest, most teachers are not that comfortable deep down with math. In fact, it was often their worst subject in school. So I feel like if we ever want kids to be better in math, we first have to make teachers better in math. I think I can do that.

What advice do you have for volunteers working with students who are struggling with basic skills?

99% of the time, it all comes down to the same thing. Students are struggling because they do not have a fundamental understanding of numbers. Instead of breaking numbers into smaller, easier pieces, they break numbers into ones - they are counters. As long as the numbers are small, counting sort of works. The problem is when the numbers get big, counting doesn't work. So what do they do? They switch to memorizing the answers. Counters grow up to be memorizers! No wonder they struggle with math - counting and memorizing are probably the two worst strategies I can think of. The key is to go back to first grade math and teach kids to add correctly without counting. From there, we can use this foundation to re-teach them subtraction, multiplication and division. Without this foundation, there is no way kids can ever understand fractions, algebra, or any other higher-order math skills. I wish I could say there's a shortcut, but there just isn't. Math skills are cumulative, and if we don't fill in the gaps, they just get bigger.

What advice would you give to adults who are trying to help kids with math, but who don't feel confident in their own abilities?

I always tell the teachers I work with: if you think you're bad in math, you probably are! The first thing an adult needs to do is to become better at math, which probably means going back to the very beginning themselves. If there's ever a point where an adult is unsure of something, they have to get help ... I don't think we realize how harmful so many standard teaching practices are to kids.

There's a lot of talk recently about kids falling behind in math. What do you think is behind this, and what can we do to fix it?

Without going into too much detail, I think the biggest problem is that much of what we're doing in math is creating exactly the wrong kind of thinking skills. We're developing very concrete thinkers when we need to be doing just the opposite. We should be doing everything we can to develop abstract, algebraic thinking skills. Instead, we're focusing too much on pictures and manipulatives and showing your work and writing everything down and memorizing and following procedures. There is a place for all of this, but I'm not sure the math establishment truly understands the consequences of going too far with all of this. My goal is to restore common sense to the teaching of math, and to make sure we bridge from these concrete models to the abstraction of numbers so that kids are actually good in math when they are older.

What would you like all people, young and old, to know about math?

Simply put, there are two ways to do math - the easy way and the hard way. Most people do math the hard way so they think math is hard. Learn to break numbers and problems down into smarter, more manageable pieces and math will be easy. It's just that simple

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