

Singapore Math - Or How I Learned To Love Numbers

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By Kathleen Jalalpour

Like most Americans, I definitely grew up **not** seeing any beauty in numbers. My math education was a jumble of meaningless steps, arcane algorithms and tear-stained time tests. It was not until adulthood that I saw the usefulness of numbers, and not until I began teaching Singapore math that I saw their elegance.

Teachers tend to teach using the same methods that were in existence when they were children themselves. Called "social transmission of acquired behavior", scientists have shown this to be common among most species. In humans, it probably explains the monolithic inertia so evident in public education.

So when I started teaching math, I used worksheets, time tests, and rote memorization - all the same tools that had **not worked** when I was a child! What else did I know?

On March 27, 2004, (yes, I remember the date!) I met Corrinne Lieu, an experienced teacher from Singapore who had come to California after her marriage, and all that was soon to change.

Singapore math is, of course, the national curriculum of Singapore, and over the last ten years, it has been spreading gradually through progressive schools and districts across the US. (Editor's Note: Singapore historically ranks #1 or #2 in Math internationally, **well ahead of the U.S.** See related story [here](#).)

I teach at a K-8 school in Palo Alto, CA, and because our school is small, change is easier, and we were able to adopt Singapore math under Corrinne's mentorship five years ago, and the change has been enormous.

Love? Math? Not when I was a child! Remember those time tests in 4th grade? I think I'd have preferred a trip to the dentist (not fun in those days!) to a math test. Now, however, I'm finding I am a strong problem-solver when it comes to the actual *concepts* of math, and so are my students.

Why? Because teaching from Singapore math books, **the emphasis is on visualization, not on memorization, and certainly not on speed.** Visualization leads to understanding, through a gradual transfer of concepts to the abstract level of mathematics. **It makes math accessible to right-brained children, and teaches rigor to left-brained ones.**

Want to see what I mean? Attempt this word problem, which comes from a 4th grade Singapore math book. The best way to understand the Singapore approach is to try an example yourself:

|| | | *Altogether, Jimmy and Samuel borrowed 24 books from the library. Jimmy borrowed 3 times as many books as Samuel. How many books did Jimmy borrow?*

Can you do it in your head? Can a fourth grader really? Any fourth grader? Well, actually, yes.

If you DRAW it, this picture is fairly simple.

Click [here](#) to view problem and Singaporean solution.

If you wander through my colleagues' classrooms at Keys School today, you will see math lessons peppered with dozens of questions:

- Can you **show** that?
- What if . . . ?
- How much more? How much less?
- Can you prove that?
- Did anyone else see it another way?

You will see students at stations, using blocks, Popsicle sticks, buttons, counters and drawings to illustrate place value and number relationships.

Singaporean educators believe children must be able to see, touch and visualize numbers before they can truly understand the myriad relationships between them:

Concrete > Pictorial > Abstract

US textbooks pay lip service to this widely acknowledged learning sequence for math, but their teaching occurs mostly at the **abstract** level.

In contrast, Singapore math spends weeks on each significant unit. Right-brained students who think visually need **lots of time** to transfer the relationships they see to the abstract level of symbols and algorithms. Left-brained students who think linearly need the anchoring of their thinking in the concrete, in order to understand what they can already intuitively calculate. *Children who have **mastered a concept at all three levels** are given highly challenging enrichment work that keeps them on the same concept as the class, but in greater depth.*

I have taught Singapore math in a low-income district summer school with just as much success as at a suburban private school - I'm truly a math convert. The visual nature of Singapore math, its accessibility to all children, and its documented success as a coherent K-12 curriculum makes it the best math program out there. I only wish I had found it sooner!

Are You Smarter Than A Fifth Grader? Sure! Courage - just give it a try! Try this one now - a 5th grade problem:

Sarah brought a bag of marbles. $\frac{1}{3}$ of the marbles were blue, $\frac{1}{6}$ of them were green, $\frac{1}{3}$ of the remainder was yellow. If there were 24 yellow marbles, how many marbles did Sarah buy altogether?

Without visualization, this problem becomes a labyrinth of fraction operations and often ends up making no sense at all. Algebra works, but the solution is convoluted. Click [here](#) to solution comparing the two methods. Could a child solve it using a drawing instead of an equation? Even better, can a child visualize it, and solve it without a pencil?

I love teaching math this way - it removes mathematics from the sterile world of grunt calculations and moves it into the realm of what we call **productive struggle, which the human brain enjoys**. Rather than memorizing formulas, children are encouraged to think, problem solve and find multiple solution methods.

One of the goals of a teacher using this curriculum is to challenge (and praise) a class of children for finding as many ways as possible to mentally calculate any given problem. Speed is NOT the goal. We're raising thinkers, not computers. I'd rather have a student who needs an extra second to do 7×8 but can equally quickly do "132 divided by 6" mentally (132 is 120

+ 12, which is easy to divide by 6!). **The student with mental math skills has number sense - perhaps the greatest prerequisite to success in math.** With a solidly developed number sense, decimals are easy, percents are not mysterious, and algebra is just arithmetic with letters instead of numbers.

Children enjoy a challenge; they like to see everyone else struggling with it too, and enjoy putting their heads together to finally find a solution. Singapore math books respect children's intelligence enough to ask them to think about math, and as a result, they learn to love it.

"Mathematics, rightly viewed, possesses not only truth, but supreme beauty."

- Bertrand Russell

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BIO: Kathleen Jalalpour taught for years in Germany. Upon returning to the US, she set about looking for a math curriculum with more conceptual strength than was available in US textbooks.

She now teaches Singapore math at middle school and, together with Corrinne Lieu, also trains other teachers. Contact them at thepiproject@gmail.com.

Link to Singapore Math [here](#).

Great post. . . I must admit to be biased. After experimenting with Singapore math with "the daughter" - a middle schooler - last summer, by going through two workbooks for enrichment (earlier grade levels just to understand approach), I was blown away. (Singapore is not her program in school).

It is very intuitive and yes, very visual. I have spoken with people who say that it "bridges" the concrete to the abstract where many other approaches do not.

I am coming from the point-of-view as a parent (no less), not teacher or mathematician. My math background is one that comes from business and life (and Wharton executive program didn't hurt either yet that was more about financial literacy than pure math) and honestly, I would not know how to take your problems and solve them as efficiently as with other programs I have been exposed to as a parent (and there have been several but not Singapore). Algebra? I would not know where to even begin...

What I especially liked about it was the simplicity, non-gimmicky approach yet it did required basic arithmetic skills and memorization of basic multiplication tables (but not as the be-all as Kathleen explains so well). Can we get over that we need these essential skills BEFORE we move on?

And it's just not public schools?

How many private schools have bragged endlessly how their kids are one or two grades ahead of other schools, to find that parents are paying major bucks for tutoring on the sly or to find that their kids really don't understand math but are getting good grades.

Three math tutors from different parts of the country just revealed that roughly 60% of their students (all private school kids!) are there just so they "understand" math (the parents concern) NOT because the kids' grades are terrible.

Parents are "sensing" that their kids may not be really understanding ---

-- C.J.

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