


The Singapore Method

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What is the best way to teach math and science?

It's a question that Canadian educators and parents have been asking a lot in recent years, prompted by domestic and international tests that indicate a decline in the math and science test scores of Canadian students. Ontario's Education Quality and Accountability Office (EQAO) shared results in 2014 showing that more than half of the high school students in Grade 9 Applied Math are not meeting the provincial standard.

Math education is a subject of lively debate in this country: Should we stick with the "new math," or return to the old "drill-and-kill" method? Or perhaps the answer is a bit of the old with a dash of the new?

As Head of School at Trafalgar Castle School, an independent day and boarding school in Whitby, Ont. for girls in Grades 5-12, I have certainly asked these questions myself. But instead of wrestling with the "new math vs. old math" argument, we at Trafalgar Castle chose another option: Singapore Math.

We introduced Singapore Math to our school three years ago, after researching a number of programs and determining that this method had the best achievement results internationally. At Trafalgar Castle, we have a "world-best" education philosophy, which means we are constantly evaluating programs from countries around the world that have proven to be successful. Students in Singapore in the middle school years rank consistently in the top worldwide for math and science testing, way beyond most other countries (including Canada).

Trafalgar students in Grades 5 through 8 learn math through this innovative, even contrarian, teaching method, which turns traditional approaches upside down. Singapore Math deliberately slows down the teaching of math, taking more time to ensure students grasp each concept before moving on. For example, students might spend two weeks on multiplying fractions, instead of spending a day or two and then coming back to it later.

Singapore Math is also highly interactive, and approaches mathematical problems from different perspectives, taking into account all the ways children learn (visual, aural, verbal, physical, etc.). Students use visual aids like bars and blocks way before they start writing equations with "x" and "y," so they achieve a deeper grasp of the actions they perform. This visualization is not deployed nearly as much in Canadian classrooms. In most settings, you would see a concrete-to-abstract strategy whereby multiplication, for example, would use physical objects, then shift to the abstraction of lining up numbers in a multiplication equation. Singapore Math introduces a middle step between the concrete and abstract,

called the pictorial approach. The students draw a diagram of the concepts going on. This extends to diagramming word problems on paper, rather than the fatiguing and often frustrating scenario of trying to picture a problem in their heads.

One happy result of all this is that when students reach algebra, they've already met the core concepts pictorially; indeed in most cases students in Grade 6 are able to understand algebraic concepts that normally wouldn't be grasped until mid-way through Grade 8.

Another important element of Singapore Math is that it relies on strong mathematics teaching. You need people who know and love mathematics to teach it. Unfortunately, there is a dearth of qualified people to teach the subject, especially at the elementary level, so this is a challenging requirement. Yet surely we should not deploy a mathematics curriculum to satisfy the aptitude of the teachers instead of the needs of the children they are entrusted to teach.

Our results

When it comes to student performance, the response to Singapore Math has been overwhelmingly positive. Each year, the Singapore Math students have performed above grade level, and their overall final averages continue to rise each year. Perhaps even more importantly, our students love math. In fact, we were so pleased with the results that we added Singapore Science to the curriculum last year.

Like its math counterpart, Singapore Science is an interactive and "hands-on" method of teaching, devised to stimulate students' natural curiosity and cultivate their spirit of inquiry. In my view, nothing saps the excitement and power out of learning like telling kids something they could find out for themselves. In Singapore Science, students do experiments to learn key concepts, incorporating active discussion and real-world examples. We've put a lot of resources into our labs so that the children can learn by doing. The core of the program is teaching the experimental method, and we intuitively know (and for doubters there is plenty of research to back it up) that students learn best when they are highly engaged.

When it comes to the "math wars," at the end of the day you have to base it on results and how kids learn best. The Singapore Method might not work for everyone, but it certainly has for us. We will continue to re-evaluate it though, as we do all of our programs, and to look beyond our borders to find the best teaching methods possible.

En Bref - Il y a trois ans, l'école Trafalgar Castle School a mis en place la méthode de mathématiques de Singapour pour ses élèves. Cette méthode novatrice d'enseignement des mathématiques aide les élèves à saisir des concepts beaucoup plus avancés que ce que l'on attend d'eux. Ainsi, les élèves de 6e année sont capables de comprendre des concepts algébriques normalement enseignés en 8e année. À

l'école Trafalgar, la méthode de Singapour fait ses preuves chaque année et les notes en mathématiques des élèves en témoignent. Cette méthode pourrait ne pas convenir à tous, mais elle nous a été utile.

Photo: Sarah Harries-Taylor, Trafalgar Castle School

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