

Singapore Math

In 2007, students in the United States and dozens of other countries took a standardized math test called TIMSS, the Trends in International Mathematics and Science Study. American fourth grade students scored 11th place out of an overall 36, while eighth graders scored ninth out of 48 countries in a year when five usually higher-scoring nations did not participate in the study. Why American students scored below nations such as Kazakhstan and Russia, and what a lower score means and how to improve mathematical understanding have been topics of intense debate ever since. One solution some educators advocate is to learn from the country that has consistently scored in one of the first three places on the TIMSS exam: Singapore.

Singapore launched its national math program in 1982, less than 20 years after the country became an independent republic. When students failed to prosper in math, the government revamped its math program, making the assumption that a nation with no natural resources other than its people could not flourish without an excellent educational system.

“In Singapore, we are not as concerned about performance on a world test as producing students who are contributing members of society,” says Duriya Aziz, spokesperson, publisher and general manager of educational publishing for Marshall Cavendish International, which publishes Singapore Math textbooks. “We thought about what do we want Singapore to be like 10 years from now. What capabilities do we need in our people?”

The answer to that question—the abilities to communicate internationally and creatively solve problems—led to wide changes in education. These changes included establishing English-only schools in a multilingual country where no one’s first language is English, and a new system of teaching math focusing on problem solving. Within three years, Singapore had jumped to the number one place in the world on the TIMSS test.

“The fundamental philosophy is that the purpose of math is not to be able to do computation, but to be able to solve problems,” says Aziz. “Computational fluency [being able to add, subtract, multiply and divide quickly] is good insofar as it facilitates conceptual understanding and problem solving. Much of computation can be done on a calculator but children need to be able to understand what and why they are calculating, to have the ability to manipulate the various aspects of numbers. We do not

want children to focus on calculation so much, as it will become a less important human skill.”

Aziz makes an analogy between calculation and memorizing historical facts. “We don’t want children to memorize information. A computer performs that function better. We want them to be able to have skills to draw conclusions and analogies rather than to recite dates.”

Singapore Math proponents say that the skills children acquire through problem solving in math should be transferable to other areas.

“They should be able to think in different ways, to think through a situation where the outcome is not clear,” Aziz says.

One of the life skills Aziz and others hope to promote through



Singapore Math is perseverance. In an age when attention spans are as short as a blip on a television screen, that’s a valuable skill to cultivate. “Perseverance is one of the most important aspects of problem solving,” she says. “If you are used to approaching unknown situations in different ways, you have been persevering.”

Unlike U.S. math education with its broad, shallow focus, Singapore Math teaches only a few topics every year, but what it teaches, it teaches with a depth and complexity generally unmatched in the United States. Singapore Math tends to focus on developing problem-solving skills.

“We deal with fewer topics at each grade level,” Aziz says. “We ensure that the few concepts that we do teach weave previously learned concepts into the learning of a new concept.”

Aziz explains the progression of a child’s development of what mathematicians call “number sense,” the understanding of numbers.

“In grade one, the child is first introduced to numbers one through 10. Then we introduce addition of numbers one to 10. Then word problems one to 10, and subtraction of one to 10. Then we introduce numbers one through 20 using addition, subtraction and word problems. We get into place value—the differing value

of the digit 1 in the ones or tens place in a number. Then we go on to one through 100.”

Aziz says Singapore Math uses a “concrete pictorial abstract approach” to helping children visualize math word problems. “Math is experiential,” she says. “Children do math by using manipulatives and learn concepts by doing something.”

Singapore Math Programs in San Diego Schools
(SingaporeMath.com)

- Chula Vista Elementary School District
- SDUSD charter schools
- Christ Church Day School
- Frances Parker School
- Greater San Diego Academy
- Santa Fe Christian School

Children progress from using manipulatives—objects the child can touch and move and count—to drawing models of problems. Aziz believes that this visual modeling is a bridge from concrete hands-on math to conceptual math, being able to do and understand problems in your head.

At the 2010 San Diego Conference of the National Council of Teachers of Mathematics, teachers from all over the country flocked to 18 separate sessions to learn how to bring Singapore Math to U.S. classrooms. Time will tell if this new method of teaching old concepts will help prepare the American workforce for the unknowns of the 21st century economy.

“Success in the global workplace will be about how we grapple with meeting unknown situations, how we will reduce the complexity of problems to a level we can deal with in an effective way,” Aziz says. “[Communication and problem solving] are really the capabilities we see as significant for a successful economy and society. It would be a bit much to say it is only about math. It is a philosophical outlook.” ❖

Cynthia Jenson-Elliott, M.A., a former mathphobic and current mathophile, is a freelance writer and educator in San Diego.



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