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News

## Westtown School takes on Singapore Math

### Singapore students have ranked high in international tests

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By CHRISTINA MELE

Following disappointing test results from American students in the areas of math and science, Westtown School has adopted Singapore Math, a curriculum that follows the teaching style used by top-ranked Singapore.

"It's alarming how poorly Americans are doing," Sue Gold, director of communications at Westtown School, said. "In the 21st century, our students need very strong math skills. At Westtown, we emphasize STEM disciplines."

STEM refers to science, technology, engineering and mathematics.

The shortfall in math and science learning endangers America's leadership position in the world, business leaders and politicians have been warning for years.

The need for a change in curriculum is becoming increasingly apparent, as teachers across the nation have continued to observe unsatisfactory performances by American students on international math assessments.

One such exam is the Programme for International Student Assessment, or PISA, which compares the math performance of 15-year-old students in 34 nations. In 2009, American students placed 25th.

Students in Singapore have ranked consistently first or second on international math exams, including the Third International Mathematics and Science Study.

When Westtown teachers decided to re-evaluate their school's math program, the answer was simple: do what Singapore is doing.

"We want to continue providing excellent math instruction to our students," Gold said. "This looks like a way that can do that."

Westtown School is a college-preparatory school with about 720 students from 20 states and 18 countries.

In September 2010, Westtown's Lower School became one of the first schools in the Delaware Valley to adopt Singapore Math — a curriculum that emphasizes problem-solving and a deep understanding of concepts.

Singapore Math will be implemented at Westtown's Middle School in September, first being introduced into the sixth-grade curriculum.

"The curriculum focuses on fewer concepts in greater depth," Gold said. "It focuses on the idea that students will master the concepts."

Promising results have already been seen.

Standardized testing results from spring 2011 showed that, after one year of Singapore Math, fifth graders showed significant improvement over their performances from the previous year.

"All the reports from the teachers have been very excited," Gold said.

Wendy Dubas, math associate teacher in the Primary Grades at Westtown School, has seen her first- and second-grade math students gain a much stronger number sense, as well as a stronger confidence in math.

"Singapore Math has taught the first graders flexibility in thinking about numbers," Dubas said. "They have learned how to manipulate numbers to

make adding and subtracting easier. For example, students think in terms of tens."

Dubas said her students enjoy Singapore Math, which incorporates games to help students practice skills without using a workbook. Each lesson builds upon the previous lesson, creating a solid foundation, and each concept is taught very thoroughly so that students gain a deep understanding, Dubas said. Model drawings also help provide students with a visual context.

"From the teacher's perspective, this program just makes sense," she said. "It focuses on the important concepts and gives plenty of practice. When teaching mental math, it teaches several strategies so students can use the one that works best for them."

Gold said the implementation of Singapore Math offers the possibility for American students to pull ahead and become competitive once again in the global economy.

"We are contributing however we can," she said of her school's adoption of Singapore Math. "It would be exciting if we can begin as a nation to bring those math scores up."

#### Concerns over lagging skills

Kelly Byrne, supervisor of math and coordinator of data analysis in the Downingtown Area School District, said math skills are crucial, and that she is concerned for her students.

"I think we need to do something," she said. "In the U.S., often once things get better we rest and don't go beyond that. We need to go beyond it now."

Byrne, who was once a teacher in Japan, said the difference she observed between her American and Japanese students is the work ethic.

"In Japan, the students weren't any smarter," Byrne said. "They work harder. They don't give up. Students need parental support and support from teachers."

Byrne believes that math skills are extremely important for students to have if they wish to be competitive globally. However, she said it is not the actual mathematic skills that are essential: it is the reasoning, and the ability to solve problems.

"The thinking involved to do the math is something you'll use over and over," she said.

Lisa Velte, senior director of human resources at Analytical Graphics Inc. agreed.

"Math and engineering teach you to solve problems," Velte said. "Where isn't that a critical skill?"

Velte is concerned because Americans have been falling behind for so long.

"The National Science Foundation has been tracking enrollment in the sciences at the college level," Velte said. "Enrollments have not increased as much as job opportunities have."

Velte said one problem is that many companies, like AGI, which makes software for the defense, space and intelligence industries, cannot hire non-U.S. citizens.

With many international students studying the sciences, this poses a problem: the United States is essentially sending these well-educated scientists to other nations to work and ultimately compete with the United States.

"Our interest is engaging American citizens' interest in science," Velte said. "Math and technology skills are highly critical. There are very, very few jobs without some element of technology involved. If you know those things, you're ahead of the game."

Velte believes that revolutionary programs like Singapore Math could help Americans become competitive once more.

"What we have obviously isn't working," she said. "If there's a proven model out there, why not try it?"

#### Stemming the tide

One person who isn't concerned about the future is George Fiore, headmaster at the Downingtown STEM Academy, which will open in August.

Fiore expects that, with an education from the STEM Academy, his students will be equipped and able to be competitive in a global economy.

"The students will be able to propel ahead," he said. "We allow them to be innovative and creative. Our kids will be very well prepared."

Fiore said the STEM Academy has many focuses, the first being science, technology, engineering and mathematics. Students will be required to take rigorous courses in those areas. In their junior and senior years, students will follow an International Baccalaureate curriculum. Students who pass under that curriculum have the opportunity to earn up to 12 credits at some universities, such as Pennsylvania State University.

Another focus of the STEM Academy is STEM Pathways, a course that students can take during their junior year to help prepare for their chosen profession. Then, in their senior year, the student can take an internship or business partnership.

The school will use inquiry-based learning and focus on communication.

"We want our students to be competitive globally," Fiore said. "This gives our kids a competitive edge. We're preparing kids for jobs that haven't been created yet."

Fiore believes that Singapore Math "has definite strengths. It has its' benefits and can show results."

The Chester County Intermediate Unit, an organization that partners with school districts and provides teacher support, recently acquired a grant to help teachers teach science.

Dina Vassallo, director of teaching and learning at the CCIU, said there is an additional grant for a summer STEM camp for kids.

"We need to start early and accelerate," she said, adding that she is concerned about the lack of students pursuing degrees in science. "It's a concern. I've talked to many graduates, and it seems they are choosing the softer sciences, such as psychology."

Vassallo said the CCIU conducts curriculum audits of Chester County districts. As a result of the last audit, curriculum was updated. The CCIU also offers teacher training, courses for teachers, brings in speakers known in math and literacy, and has a math network that meets quarterly.

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