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Scarsdale looks to Singapore for the new math

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SCARSDALE -- Dylan Cadalzo's third-graders watched intently as he placed brightly colored number discs under four columns marked 1,000s, 100s, 10s and 1s on the classroom's whiteboard.

"How much does that make?" Cadalzo quizzed the Edgewood School class, and almost immediately several hands competed for his attention.

The answer: 6,342.

"Now, how much more do you have to add to make it 6,442?" the teacher asked.

"Hundred," answered Hannah Dong, as she proceeded to add a red disc to the 100s column.

Though using math manipulatives - concrete objects that can be moved and used to represent abstract concepts - is not new to the class, it will increase in emphasis this year, as the Scarsdale school district adopts Singapore math in kindergarden through fifth grade, replacing Trailblazers, used in the district for a decade.

The textbook series, written by the Ministry of Education of Singapore, is called Primary Mathematics, and Scarsdale is the first public school district to use it in New York as its core curriculum.

Until last year, the district used Trailblazers, textbooks aligned with the so-called reform mathematics - often derided as fuzzy math - based on recommendations originally published in 1989 by the influential National Council of Teachers of Mathematics.

That approach called for a de-emphasis on manual arithmetic in favor of students' attention to the process leading to the answer. Math texts following the reform philosophy also have been criticized as covering too many topics in a haphazard sequence.

"The mainstream U.S. math curriculum is often seen as being a mile wide and an inch deep," said Nancy Pavia, the district's math helping teacher.

In 2006, the math council released the Curriculum Focal Points report, which identified important mathematical topics in each grade - from kindergarden through eighth - that students need to understand deeply and thoroughly for future mathematics learning.

This report was, at least in part, the result of the Trends in International Mathematics and Science Study, an international assessment of the mathematics and science knowledge of fourth- and eighth-grade students around the world. The study found that students from many Asian countries outperformed their U.S. counterparts.

Of the 46 countries that participated in the study, U.S. eighth-graders ranked 15th in 2003. That was the nation's best score in the three years the study was conducted (in 1997 it was 28th), but it still was behind most other industrialized countries.

Singapore topped the list every time. Math taught in Singapore is part of a national curriculum designed

by the Ministry of Education. It emphasizes the development of a strong number sense, mental-math skills and a deep understanding of place value.

"The curriculum is based on a progression from concrete experience, using manipulatives, to a pictorial stage and finally to the abstract level," Pavia said.

Last year, a 30-member committee of Scarsdale teachers and administrators reviewed the district's curriculum based on the Focal Points report.

"We piloted four programs starting last fall and decided that Primary Mathematics was most in line with our requirements," said Lynne Shain, assistant superintendent for instruction. "The focus is on spending more time on fewer concepts per year and learning them in depth so the children end up retaining more."

The new textbooks will look a lot "cleaner and clearer" compared with Trailblazers, which is heavily language-based.

"There will be fewer words on the pages, and it will be less confusing to students," she said.

Trailblazers used a "spiral approach," touching upon many concepts each year and revisiting the same topics in later grades, all while not learning them to mastery.

Cadalzo explains it thus: "In second grade, for instance, the children use multiplication tables from 2 to 5, but they haven't memorized them; and when they come to third grade, we end up relearning them. But now, they will have learned them in second grade and we can just concentrate on multiplication tables for 6, 7, 8 and 9."

The lack of drills in U.S. schools might help explain the popularity of the Japan-based Kumon tutoring centers, which have sprouted throughout the states as parents look for supplements to cement the basics. The Kumon math program focuses on drilling children on basics.

There are 1,500 Kumon centers in North America, including one in Scarsdale, home to a consistently high-performing school district.

"As an Asian mother, I am very happy with the new curriculum," said Indian-born and -raised Shobha Bhatnagar, mother of an Edgewood second-grader.

To Bhatnagar, whose children have attended Kumon centers in the past, Singapore math is a happy medium between traditional and reform math.

"In the old curriculum, there was a lot of ground being covered without really going into depth," Bhatnagar said. "And Kumon is pure drill. But, in Singapore math, they explore the concepts in many different ways, focusing on skills development with a fair amount of practice. It will help children become facile with numbers."

Jeffrey Thomas, president of SingaporeMath.com, the Oregon-based U.S. distributor of Primary Mathematics since 1998, estimated that 1,000 schools nationally are using the books as a supplement, with 200 using them as their core curriculum.

"Initially, most of the demand came from parents of homeschooled children and the gifted and talented programs, but now it's the mainstream schools," he said. "We are very proud to add Scarsdale to the list. They are a class act."

Scarsdale's decision to review its curriculum was based on "very compelling research," Shain said.

"Scarsdale is not a district to rest on its laurels. We are always looking to do even better," she said. "We want to give our students every opportunity to learn math to their full capacity because, ultimately, they will be competing in the global economy."

In the past, Cadalzo's students came to their own understanding of math through guided exploration,

which he conceded they were more "likely to forget." But this year he planned to teach the basics until his students can "feel it in their bones."

Sofia Lacagnina sat at her desk flipping through the pages of the slim Primary Mathematics, and said, "Trailblazers was fatter and heavier. This book is thin. I love this book."
