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Closing the math gap

A local charter school turns to one of the world's top-scoring nations in math - Singapore - as a model.

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Anikka Reinertson responded as only a third-grader can when asked about her favorite subject.

"Lunch," said Anikka, a skinny 9-year-old at Paideia Academy, as she smiled and flashed her bright pink braces. Her classmates giggled and chimed in with recess, art and reading.

Not one student suggested math or science as their top pick.

Anikka's behavior during a recent math class told a different story as the third-graders listened intently to their teacher's geometry questions about calculating perimeter and area. She even admitted she's learning to like math.

Leslie Davis, the teacher, handed out graph paper so the students could form various shapes out of plastic blue, red, yellow and green tiles. Several also eagerly raised their hands when Davis looked for students to solve addition and multiplication problems on the white board - without calculators.

The setting could pass for a typical suburban classroom with its computers, posters, Spanish alphabet chart and maps.

But the math curriculum embraced at the Apple Valley charter school has global roots.

Paideia curriculum director Jill Godtland said the second-year charter school picked Singapore Math this year because the curriculum emphasizes a sound grasp of the most basic concepts as students tackle more advanced math topics sooner than they might otherwise.

Teachers and administrators were looking for a method to boost math scores because they count even more in high-stakes tests mandated under the federal No Child Left Behind legislation.

They turned to Singapore, which is regularly the top-scoring nation in the world in math.

The federal government's Trends in International Mathematics and Science Study, known as TIMSS, shows Singapore consistently on top while the U.S. languishes behind countries like Japan, the Netherlands and Belgium.

Paideia students complete more homework, but the difficulty isn't overwhelming, the kids and teachers said.

"If something is hard, we can get more help," Anikka said. "It makes math more fun."

Classmate Emily Adolphsen added, "At my old school they'd just say 'do it' or 'here you go.' "

Beth Aune, director of the Division of Academic Standards and High School Improvements at the Minnesota Department of Education, said helping students become better at math is the goal.

Minnesota is currently in the final weeks of completing new math standards, which the state Legislature will examine this session.

Current elementary students are required to take Algebra 1 before entering high school. The new standards will help students become more competitive in an increasingly global economy, Aune said, and will better prepare them for careers that will require more high-level math and science skills.

According to the National Assessment of Educational Progress, 27 percent of Minnesota eighth-graders took algebra in 2003, but the national average was 31 percent; 43 percent in the top five states took algebra.

Aune added that many of the math standards would reflect greater rigor, like the curricula in Singapore and other countries. But teachers' bigger challenge is to change the perception of math as a more difficult subject.

"It's not uncommon for a mother to say to her daughter, 'It's OK you didn't do well in math because mom didn't either,' " Aune said. "But a parent would never say it's OK not to be good in reading."

For teachers, Davis said, Singapore Math devotes more time to each lesson, whereas the math curricula she has used in other schools have less emphasis on basics.

But teaching higher-level math concepts also requires teachers to be more skilled.

Elementary school teachers often teach a wide range of subjects, and if a teacher is not trained in math or lacks interest, students will have a more difficult time learning it, said Sue Little, who helped train teachers at Paideia. Little is a Massachusetts public school teacher whose district uses Singapore Math.

Sometimes teachers have to supplement Singapore Math with more hands-on activities or rearrange the sequence of lessons to ensure that students learn key concepts before taking tests like the Minnesota Comprehensive Assessments exams, Paideia's Godtland said.

Teachers at Nova Classical Academy in St. Paul received training for Singapore Math, which they have used for several years.

Ina Loobeek, Nova's curriculum specialist, said Singapore Math does not force students to merely memorize concepts and regurgitate answers.

Students must understand basic addition, subtraction, multiplication, division and fractions before moving on to algebra, for example, Loobeek said, because "if they don't have a strong foundation, higher-level math just becomes a series of steps."

Teachers using Singapore Math said they expect the curriculum to boost their test scores.

Paideia students in Davis' class said they are being challenged in their math class but that other subjects demand their attention, too.

Natalie Kogan-White, a third-grader, said her friends at other schools don't do as much work on as many timed tests or division or multiplication problems.

Of her math class, Natalie said, "It's not my favorite, but it can be fun."

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