

Learning

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MATH WHIZZES: Fifth-graders at the Charter Oak School in West Hartford, Conn., participate in a class designed to nurture math talent in a diverse group of children.

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Subtracting a 'gifted' gap in math education

Project M3 steers often-overlooked students from low income and minority backgrounds into advanced math classes.

By Stacy A. Teicher | *Staff writer of The Christian Science Monitor*

WEST HARTFORD, CONN. - When Katherine Gavin taught algebra to seventh-graders with advanced math skills, she found it was almost too late to tap into their potential. Accustomed to math coming easily, they sometimes resented the work. The key, she decided, is to grab kids when they still believe "the fun part of math is the challenge ... and persisting [until] you get that 'aha!' moment."

Now she's witnessing those treasured discoveries among third- to fifth-graders as director of Project M3: Mentoring Mathematical Minds. Based at the University of Connecticut's Neag Center for Gifted Education and Talent Development, it's designed to nurture math talent in a diverse group of students. About half come from low-income families, and many are not native English speakers.

Ms. Gavin recalls a girl whose family spoke Spanish at home. When she was chosen for Project M3, her teacher was surprised, having planned to hold the girl back because she wasn't doing well at reading. "We said, 'We see a lot of good creative and critical thinking skills in her' ... and she ended up being one of the top students when she left fifth grade."

An independent evaluation shows students have significantly outperformed control groups in the 10 Connecticut and Kentucky schools where Project M3 has been piloted.

Too often, experts say, students from low-income backgrounds or certain minority groups are overlooked for placement in gifted and talented programs. "I can think of no other issue in the field of gifted education that is more important than that we find these students whose potential must not be lost," says Joyce VanTassel-Baska, president of the National Association for Gifted Children and a professor at the College of William & Mary.

Data on low-income students in gifted programs nationally dates back to the late 1980s, when a study of eighth-graders found that only 9 percent came from the lowest-income group, while 47 percent came from the highest.

In 1985, the federal government set up "Javits grants" to serve groups traditionally underrepresented in gifted and talented programs. Project M3 is now in its fifth and final year of a \$3 million Javits grant. Overall, the federal money pales in comparison with other education programs – just about one penny per child identified as gifted, Dr. VanTassel-Baska says – but it has helped spur progress. School systems

have begun to use a better variety of assessments, for instance, including nonverbal tests to find talents that might be masked if students are still mastering language skills.

One barrier is that many schools still look to teacher referrals before evaluating students for gifted programs, says Donna Ford, an education professor at Vanderbilt and codirector of that university's Achievement Gap Project. "Teacher training is critical to recognize potential," she says, but few teachers learn much about gifted education or how to work with culturally and linguistically diverse students. Project M3 took these issues to heart, using a wide range of measures to identify second-graders with "talent potential," and then building in extensive support for teachers.

"It's a little intimidating to an elementary teacher to try to teach a program like this, because it's high-level math," says Jo-Ann Lizon, who taught the M3 curriculum to two groups of fourth-graders at Charter Oak Academy of Global Studies in West Hartford, Conn. The students participate for three years, working on concepts one to two grade levels above what's typical. Every step of the way, Ms. Lizon says, "the support was unbelievable."



TEAM LEADERS: The Project M3 math class is taught by Kristen Sanderson (left), and visited weekly by Ann Marie Spinelli (right), who leads the program's professional development team.
JOANNE CICCARELLO –
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For two weeks in the summer, she and fellow teachers went through the curriculum with the developers, pointing out any trouble spots. During the school year, they have four professional development days and weekly visits from a Project M3 specialist.

About 30 percent of the students at Charter Oak are from families that speak a language other than English at home. They particularly benefit from the emphasis on vocabulary, discourse, and writing in M3. "I've seen the growth – in discussions about math, working on a team, solving problems, thinking on a higher level," Principal Mary Thompson says.

Even students who don't have as much background knowledge coming into the program excel, Lizon says. "They see things that I don't see. They amaze me." She recalls a girl looking at patterns placed on the windows that represented various numbers multiplied together. Some were examples such as 6×6 . "She figured out the concept of square numbers just by looking at those arrays on the windows ... and she figured out the why. That's the thing about M3 ... it's not just rote computation."

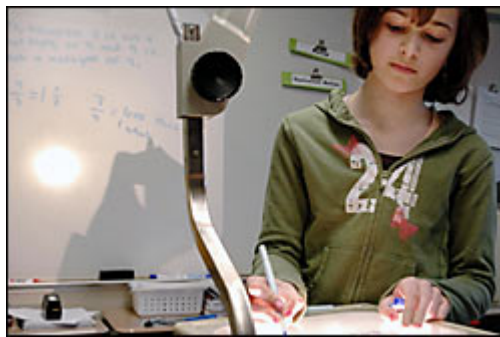
Teachers are trained to pose open-ended questions to children and invite them to challenge ideas. The respect and focus is palpable in Kirsten Sanderson's classroom, where the Charter Oak fifth-graders in M3 gather once a day for an hour.

At the whiteboard, Ms. Sanderson writes $\frac{3}{4} + \frac{4}{4} = \frac{7}{8}$ and then asks, "Can you add fractions like this?" The students let out a collective groan and say "No." But she pushes them to explain why. One boy says that you can't add the denominators (the numbers on the bottom) that way, because "it's like a pie in slices, and that's final."

After reviewing the concept of equivalent fractions, she sets them to work on an exercise related to ratios. They have to draw the windows for a fun house at a carnival, based on certain rules, and write explanations.

Today, Ann Marie Spinelli, leader of the M3 professional development team, is here for her weekly visit. She leans down to see the work of Ashley, a petite girl decked out in pink, who excitedly shares with her an observation: No matter what length she chooses for the window, it turns out to be a square because the directions tell her to draw it on a one-to-one ratio.

Sanderson asks three students to show their work on the overhead projector and explain it to the class. But this isn't about rewarding students for getting it "right." When one of them says, "I'm not sure if my answer is right or wrong," Sanderson replies: "Maybe some of your mathematician friends can help you." There's not a hint of embarrassment, and after several suggestions from students, he corrects his formula.

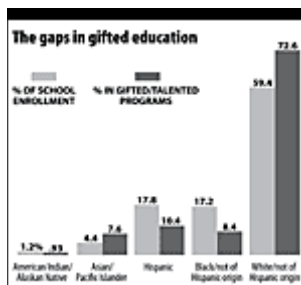


MATH DISPLAY: Fifth-grader Becca shows her M3 class how she arrived at her answer to a ratio problem. The fact she understands some math exercises better than her mom makes Becca feel 'kind of proud,' she says.

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That's an aspect of this class that Kevin particularly likes: "We have 'rights and obligations' in class. We're allowed to challenge an idea, but if we're wrong [or] the other person's wrong, we both learn something," says Kevin (a pseudonym used at the request of school officials). He also enjoys exercises called "Think Deeply," where he figures out multiple elements of a word problem and explains his answers. "We get really into it ... and then time flies."

"I really liked pushing the oranges with our noses," says Becca, another student, of an exercise they did built around "Wacky World Records." "We were doing line graphs. It was really interesting to see what rate you went at," she explains.



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Some of Becca's homework exercises don't look too familiar to her mom. "It made me feel kind of proud that I kind of understood it better than my own mom," she says with a laugh.

The project does bring parents along, though. The teachers send home regular newsletters with math activities for parents and kids to do together. Last year, after a series of lessons on probability, families

came in for a Math Night in which they played games of chance the students had designed to favor the house (the event was also a fundraiser for a service project). The kids were giddy at first, Sanderson says, and then they had to "fess up" and explain the probability involved in the games.

'One of the most impressive programs' in 30 years

Project M3 was examined by independent consultant Susan Carroll, president of Words and Numbers Research in Torrington, Conn. "I've evaluated programs for 30 years, and this is one of the most impressive I've ever seen," she says by phone. On both multiple-choice tests and open-ended questions used to measure grasp of concepts and problem-solving, students did better than peers who showed the same potential but weren't placed in M3 classes.

In Hartford, a district next to West Hartford where many schools have low test scores, students from M3 are entering accelerated math in middle school, "and it's the first time these schools have sent kids to that program," Gavin says. Having seen the benefits, principals are asking for the curriculum to be developed for higher and lower grades.

The third- and fourth-grade M3 curriculum is already for sale and is being used in 43 states, Gavin says. Educators as far away as Singapore have expressed interest in using the curriculum to increase the critical thinking and creativity in their classrooms.