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More Oregon students are getting math

Published: Saturday, November 07, 2009, 7:50 PM Updated: Sunday, November 08, 2009, 9:18 AM



Betsy Hammond, The Oregonian
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Eighth-graders in Steve Vancil's geometry class at Gardiner Middle School in Oregon City are eager to put their knowledge of alternate interior angles, linear pairs and related concepts to use in his class. Vancil is among the vanguard of Oregon middle school math teachers who stay on each topic until every student masters the core concepts needed to advance to the next grade.

Oregon math teachers have moved middle schoolers far enough ahead in math that the typical eighth-grader now can do math at nearly the same level as many high school sophomores.

Middle school students in every racial, ethnic and income group show greater mastery of mathematics -- including algebraic reasoning, statistics and geometry -- than they did three years ago.

Educators attribute much of the progress to Oregon's embracing a national recommendation to drastically scale back the number of math topics covered in each grade.

At the same time, more Oregon middle schools organized teachers into teams that meet regularly to discuss their students' progress and learn from one another's teaching successes and failures.

Sample question #1

John puts a 13-foot ladder against his house. His ladder is 5 feet away from the wall and reaches 12 feet up his house. Similarly, John uses a 16 1/2-foot ladder that is 6 1/4 feet away from the wall. The longer ladder will reach _____ feet up the house.

A. 15 1/4 B. 15 C. 14 D. 13 1/4

Source: Oregon Department of Education DAN ADAMS@THE OREGONIAN

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Sample question #2

Which equation is shown on the graph?

A. $y = 3x + 3$ C. $y = 2x - 3$

The result: Math lessons are more engaging and more thorough -- and test scores show more students understand and retain what's taught.

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Dick Morris:

a concrete way ... and they are actually enjoying it," says Tillamook Junior High math teacher Jill Sumerlin, president of the Oregon Council of Teachers of Mathematics

With fewer concepts to cover, teachers take the time for more hands-on lessons, more visual cues and more real-world examples. They also do more to check that all the students have a topic down before they move on.

Sometimes that requires them to circle back and teach something a second or third way before it sticks, but the new emphasis on teaching one topic well instead of two topics at a surface level gives teachers time to do that, says Dawn Driver, math teacher at Oregon City's Gardiner Middle School.

Gardiner eighth-graders Terrel Hood, Erin Morris and Max Ramirez finished one another's thoughts as they talked about their geometry class, taught by Steve Vancil, while working to create equivalent line segments in class last week.

"If we don't get it, he goes through it again with us ..." Max said.

"... so we make sure we get it," Terrel interjected.

Said Erin, "I get it more, which makes it more enjoyable. I don't feel confused all the time."

"There's homework every day," added Max. "But we understand it. So it's cool."

Gains could be lost

What's remarkable is that math teachers pulled off the changes in math instruction without the help of updated textbooks.

"People had to go and find other resources rather than teaching from the book," says Fergus Galbraith, math teacher at Beaverton's Conestoga Middle School.

That changed this fall, when most middle schools got new math books, after six years of using books geared to the old mile-wide standards. Portland, the state's largest district, is an exception, choosing to delay getting new middle school math books, as are Oregon City, North Clackamas and Gladstone.

Oregon math experts predict middle school math achievement will continue to surge now that new textbooks are in place. Most middle schools chose a widely praised series called Oregon Focus, written by six Oregon math teachers specifically to teach Oregon's new math standards to middle schoolers.

More improvement is needed because Oregon's math achievement is still pretty average when compared with other states', and too many students still arrive at high school unprepared for Algebra I, says Manny Norse, Beaverton's math curriculum specialist. He blames too much reliance on calculators, which students can use on their state tests as early as third grade, for creating holes in students' math knowledge and skills.

Math achievement in Oregon high schools has remained stubbornly flat, with barely half of sophomores meeting grade-level standards. That stagnant math achievement will be reflected in mediocre grades for many high schools when the state issues report cards on schools Tuesday.

A few high schools, including Forest Grove and Oregon City, made dramatic improvements with their lowest-achieving math students by requiring them to take a second math workshop class in addition to their regular math class.

But unless high school math instruction improves statewide, the gains made by middle schools could be squandered as ninth-graders encounter one-size-fits-all high school math, says Shannon McCaw, a

B. $y = 3x - 3$ D. $y = 2x + 3$

Sample question #3

The shaded part of the giant cookie shows what Terry ate. Cami and Renie each ate half of what was left over. What fraction of the cookie did Cami eat?

A. $\frac{1}{4}$ B. $\frac{1}{3}$ C. $\frac{3}{8}$ D. $\frac{3}{4}$

Source: Oregon Department of Education

Answers: Question 1: B, 2: D, 3: C

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high school math teacher who consults with districts across Oregon to improve their math results.

Fixing a broken system

Under state guidelines, Oregon teachers aren't required to teach to the state's new pared-back math standards until next school year.



[View full size](#) Doug Beghtel/The Oregonian

The four teachers who teach seventh- and eighth-grade math at Gardiner Middle School in Oregon City, (from left) Amanda Larsen, Dawn Driver, Steve Vancil and Steve Kmetc, meet weekly to talk about how their students are progressing in math and how they can teach more effectively so students aren't left behind.

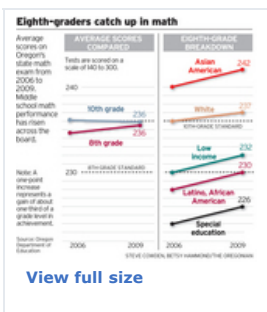
But middle school math teachers were hungry for a way to fix a system they knew was broken, says McCaw, who is lead author of the Oregon Focus series.

"Middle school teachers knew they were spending 80 percent of their time teaching things that students had already been shown in previous grades but have never mastered because the curriculum never stayed on it long enough to go deep," McCaw says. "Kids were hating math because nothing was ever new and they never got good at anything."

Because teachers increasingly understand that all students can master math, they are changing their techniques, says Winnie Miller, past president of the Oregon Council of Teachers of Mathematics who now helps train other math teachers.

"They're opening math up to more kids, not just the kids who have always been successful -- the memorizers," Miller says. "Now it's hands-on, it's visual, it's more conceptual."

Teachers build understanding in different ways, not just one way, the teacher's way."



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In middle school classrooms, Miller says, "They may be using graphing calculators. They are representing data in many ways. You see them talking with each other, working on a rich task that involves deep thinking."

Sumerlin, the Tillamook teacher, says hands-on materials may make math class sound like play, but she now covers more rigorous algebra concepts in eighth grade than before.

She used to have to teach measurement, area and volume. Now that's handled in an earlier grade. Same with proportions. Which allows her to spend about 40 percent of the year teaching a powerful concept: linear equations. She doesn't start out with the dry formula of $y = mx + b$, though students will eventually learn it, but with tangible lines and their starting points, slopes and other characteristics.

"There is a lot more algebra in eighth grade than there was five years ago," she said.

In the geometry class at Gardiner Middle School last week, students learned how to use a compass to measure and create line segments not by looking in the textbook but by watching the teacher do a similar task, then by doing it themselves.

Each student had to "construct" two line segments of equal length, then construct another of twice that length. Students furiously worked their pencils and their compasses.

The teacher checked students' labeled drawings to make sure each understood the task and could do it well. By the end of class, every student had earned a tiny gold star and posted it next to his or her name on the classroom wall.

Said Sumerlin: "Real-life examples take longer. But when you've got time to do that, students have something to anchor it to."

-- **Betsy Hammond**

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Collaborate: Talk more to other math teachers to learn from one another's successes and to spot weaknesses in their own lessons.



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bozoduhclown

November 07, 2009 at 8:29PM

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baddogcarl

November 08, 2009 at 9:27AM

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Lincoln's cheerleaders may be sitting out a game or two, but ODE's squad is clearly on the job.

A one point gain represents 'about a third of a year' in math achievement? Better go find that calculator! This test has a range of about 160 points, from 140 to 300. Are you claiming that a student with a score of 300 is 50 years ahead of someone with a score of 150? Or a score of 263 is 10 years beyond a score of 233? Really? What in the world can that even mean? Did you get that number from an Oregon Math Expert? To anyone who can do math, that's just silly. So is the notion that these increased scores represent real learning that could be 'squandered' if the high schools don't hold up their end of the bargain. Real learning doesn't get squandered, though I've heard ODE use that stock phrase before.

If these 'gains' (an entire point on the average!) don't translate to 10th grade achievement, then they aren't real. It's that simple. Real gains don't dissipate within 24 months.

So far all we know is that if schools narrow their focus to nothing but test prep, average test scores increase. What we don't know is whether that represents improvement in the long-run. Report back when 10th grade results and then SAT math results are impacted. (How about the SAT math scores of the high schools that you mentioned, for example?) That will be a story.

Fluff stories like this don't help kids. They certainly don't inform the public. One can only

wonder what the purpose might be.

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betsyhammond

November 08, 2009 at 11:51AM

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baddogcarl:

I don't usually do this (just ask them!), but let me please defend the Oregon Department of Education on this one. If you detect spin or exaggeration in this article, please put the blame squarely on me and The Oregonian, not on the folks at ODE. They ran the disaggregated scale scores at my request and made no attempt to spin them in any fashion. The conclusion that there is newsworthy advancement in math achievement is my interpretation of the numbers, bolstered by a lot of reporting, including interviews with math experts wholly outside ODE.

Your disparagement of a 1- or 2-point gain in scores is also off the mark. Those are worth noting. Look more closely at the chart. In eighth grade, students are expected to score a 230. Two years later, in 10th grade, they are expected to hit 236. Two years advancement = 6 points. That equals about one-third of a year's advancement per point. (I didn't even need to reach for my calculator to figure that one out.) So if a student can end eighth grade one or two points closer to that 10th grade target, that's a big deal. I'd bet my slope and my y-intercept on it.

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Spastica Rex

November 10, 2009 at 8:33AM

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I cannot believe how laughable your response is. Oh wait -- you're a journalist. Never mind.

No need to understand anything, right? Just listen to a bunch of enthusiastic people and report whatever it is they tell you. We can't expect you to display any logic, to have any understanding of statistics. Besides, you're writing for Americans and they don't value intellect anyway!

Pathetic.

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idalou

November 08, 2009 at 10:02AM

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Stories like this me wish that I could go back 53 years and take 8th grade math again like it is taught today. I always enjoyed the logic of math, but rarely saw the real-life application of it. It probably would have made a difference in my life if I had.

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Larry Norton

November 08, 2009 at 10:51AM

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Progress is progress however slight. But it is more impressive that this gain came not from decreasing class size (count them) nor from spending more money per pupil. It came mostly from "embracing a national recommendation to drastically scale back the number of math topics covered in each grade." Gee who would have thought?

And, I would add dedicated teachers.

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baddogcarl

November 08, 2009 at 2:21PM

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One problem with your analysis is that the score of 230 (in your illustration) is on the 8th grade assessment and the score of 236 (the dumbed down cutoff) is on the 10th grade

assessment. They are not the same test, and to treat the RIT scores on the two different tests as though a 6 point difference can be divided by two for a quotient of 3 is simply to misunderstand the entire test structure. And only a couple of years ago we expected an 8 point gain from 8th grade to tenth...it seems peculiar to call a 3 point gain a year's growth when up until 2007 it took 4 points to qualify as a year.

And again, if three points adds up to one year, then does a score of 263 signify 10 years' advancement over a score of 230? (I missed the answer to that one)

As for whether one or two points is significant, we will just have to disagree. I think that a gain that is inside the measurement error is nothing to get excited about, particularly as those averages tend to swing about from year to year.

If you are correct, then I would expect that the improvement in 10th grade passing rates should begin to show up next year. It will be fun to watch.

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bruinfan

November 09, 2009 at 8:15AM

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I totally agree with baddogcarl, the 8th grade test and the 10th grade test are not the same. I often hear people speak about the two as if they are identical. Moreover, I also agree that if this improved strategy is really more effective then the old way, then real learning will have occurred and we should expect to see improved results on the 10th grade test--regardless of whether or not the high schools embrace the new, slimmer set of topics. I fear that a lot of the improvement is due to better test prep--I hope I am wrong.

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Prof1950

November 09, 2009 at 10:03AM

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As someone who got A's in advanced Algebra in High School and Calculus in College, I have an entirely different view on the whole PURPOSE teaching math. Plus, I'm only moderately impressed by the by the actual techniques cover in this story.

First, my reaction to the "real world examples" shown here/

1. Why is sample number #1 a realistic question? Would John really own both a 13 inch ladder and a 16.125 ladder? If so, then he must have a full garage full of ladders. Why would he bother to measure exactly how far the ladder is from the house, unless he is truly obsessive-compulsive?

Is this really the most realistic version of the Pythagorean theorem that these people could create?

2. Sample #2 is clearly a version of the "dry $y = mx + b$ " approach, but neglected to label it as "bad example" of real world mathci

3. In sample number #3, why on earth would Terry, Cami, and Renie calculate the fraction of a cookie that they choose to eat in this fashion?

Is this really the best version of proportions that these people could create?

4. I sure hope that the example in the text, of students using a compass to create one line that twice as long as the other was a very introductory use of a compass, because a ruler would be a rather better tool for that purpose.

Now, my larger thoughts at the purpose of techniques match (rather than just the techniques for doing so).

5. I actually like the the idea of using real-world examples to teach math, but when are these students going to use anything remote like these techniques to solve problems in their own "real life"?

If I were John, I would use an adjustable ladder and a very simple "trial and error" strategy to find the length of ladder I need. Terry, Cami and Reni are going to do exacting what they did do -- divide the cookie the way the wanted, without worry about the fractions. And when was the last time YOU used a compass, let alone to draw one line that was twice as long as the other?

6. Finally consider that this is Middle-School math, and that by the time these students get to High School, they will almost certainly be required to Algebra II in order graduate.

In that case, no amount of "real world examples" about quadratic equations will ever have any application to the "real world" of anyone but engineers and statisticians (who will undoubtedly make up less than one-tenth of one percent of the student who have to sit through Algebra II).

8. We already have a one-third drop out rate in Oregon's high schools, and the state system is now increasing the number of advanced math courses that students must take to graduate. How can the people in charge of the state's minimum curriculum possibly believe advanced math classes will do anything but raise that drop rate? I can't imagine how more "real world" problems would solve that problem.

7. How in the world did we ever reach the conclusion that Math is the best way to prepare students for the real world? The argument I always hear is that it teaches "critical thinking." But for the life of me, I cannot see how any of the college student I teach could ever use these skills at all -- except on the rare occasions when they take another Math class.

Even as someone who is good at math, I feel as if this heavy emphasis on math for EVERY student is the equivalent of old-fashioned British education, where they used to require students to read Latin and Greek, for the supposed purpose of improving their critical thinking skills.

That approach did just as much to prepare those students for the "real world" as advanced Algebra will do for our students here in Oregon.

==>Prof1950

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TheScore04

November 12, 2009 at 1:36PM

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"1. Why is sample number #1 a realistic question? Would John really own both a 13 inch ladder and a 16.125 ladder? If so, then he must have a full garage full of ladders. Why would he bother to measure exactly how far the ladder is from the house, unless he is truly obsessive-compulsive? "

Surely I'd expect someone who was so good at math to be able to realize that 16 1/4 is equivalent to 16.25 and that 16.125 is 16 1/8....

Anyways, I'm a math teacher and being good at it, when I bought a new car, I walked in, and I'm sure the salesman peed himself when I said I was a math teacher, because he knew he wasn't going to make much off of me.

People who are ignorant in math are the reason we're in the crisis we're in now, because lenders who were better at math knew how to take advantage of them and make them agree to stupid loans.

Math is power. If you don't know your math, then somebody who does is going to find a way to profit off it.

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chalktalkers

November 09, 2009 at 1:08PM

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Way to go Oregon City and Tillamook! Students are engaged in their learning and teachers are being given the tools and support to lead effective classroom instruction.

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