

This year, forty-five students are expected to graduate from the Teacher Apprenticeship Program at Champlain College. It's the largest class in the program's twelve-year history.
> "I'm not working for stockholders anymore. I'm kind of looking forward to engaging with kids and doing something a little more worthwhile in life,"...

Director Scott Mosher says the program offers a fast track to a teaching license for midcareer professionals who often have a mortgage and family responsibilities. "If they're going to make a career change, it needs to be something that they can do quickly," Mosher said. "This program fills that gap."
Andy Grab was laid off last June after about thirty years at IBM. He had enjoyed coaching kids in sports and being involved in training sessions at IBM, so he had the idea of becoming an educator. Now, thanks to the program, he's a licensed teacher less than a year later. Grab, who has an undergraduate degree in electrical engineering and a master's degree in business administration, took a big hit in his salary-earning 40 percent of what he once did-but says it's worth it to do something he's passionate about.
"I'm not working for stockholders anymore. I'm kind of looking forward to engaging with kids and doing something a little more worthwhile in life," he said. This spring, he's been working as a substitute teacher at the St. Albans Town Technical Center. He has a full-time job lined up there next fall teaching middle school science and math.

The program started in 2002 in the Essex Junction School District as a way to develop new teachers by offering an alternate way for professionals to get into teaching, Mosher said. It expanded to a regional program and then became statewide in 2010, accredited by the Vermont Agency of Education.
The Teacher Apprenticeship Program became part of Champlain College last July, which allowed for more resources and growth. Tuition is $\$ 10,900$. Eighty percent of students go on to teach and work in a school system the next year. The students, at an average age of 35 , attend about fifteen seminars at Champlain and spend much of their time student teaching with a mentor. That differs
from some traditional programs in which students study education and later become student teachers.
"It's very much a learn-and-apply model," Mosher said. That appealed to Carly Brown, 28, who decided she wanted to teach after earning a master's degree of science in plant biology from the University of Vermont.
"I had just come out of two years of school and had been through a lot of schooling so the eight months was great," said Brown, who had taught high school science in the Peace Corps in Kenya.

Mentor teachers also gain from the experience, said Brown's mentor, Katy Abbott, a science teacher at Mount Mansfield Union High School in Jericho. "It makes me more intentional about my teaching, and it keeps me current with practices that are happening," Abbott said.

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# Ted Nutting <br> Perspectives from a Retired Math Teacher 

Shortly after I began teaching high school math in 1997, I realized that much of what I was doing wasn't working well at all. Our school (and the entire Seattle district) was experiencing the change from math instruction using textbooks that resembled ones I had used in high school 40 years earlier to a new type based on "reform" math.
"Reform" math (also known as "inquiry-based" or "discovery" math) supposedly stresses "understanding concepts" and produces students who can do more than merely perform mathematical procedures by rote. Reform classrooms usually use reform textbooks, incorporate calculators extensively, have students work in groups, and have a teacher who performs as a "guide on the side" rather than a "sage on the stage," allowing students to discover mathematical truth in the process of solving some "rich" problem rather than merely having a teacher
tell them how to do it. Grading typically favors student's work on projects, journals, or portfolios, and tends to de-emphasize scores on tests.

Unfortunately, this just doesn't work well. As the years went by, I saw students reach high school with more and more diminished mathematical abilities as their exposure to reform math stretched farther and farther back into middle and elementary school. Before long, a large percentage of incoming high school students hadn't even learned their times tables and couldn't do basic math such as simplifying fractions or dividing an integer by a single-digit number; much of that was due to excessive use of calculators.

After a couple of years trying to teach the "reform" way, I decided to change, and I started teaching classes the way I wanted. I explained the math, calling on students as I taught and getting them involved in the explanations.

# "As the years went by, I saw students reach high school with more and more diminished mathematical abilities as their exposure to reform math stretched farther and farther back into middle and elementary school." 

I required lots of practice from my students. I assessed their progress with rigorous quizzes and tests. And most of those students did reasonably well.
After a few more years, I started to get a little bolder and to complain, writing letters to school district officials telling them that reform math wasn't working. In 2006, I was fortunate to become a charter member of Where's the Math?, an organization founded to oppose the use of reform math in schools and to encourage what we called "explicit instruction," where the teacher is supposed to actually teach.

Regarding quizzes: a colleague of mine told me about some research the Army had done showing that retesting students on material they had been tested on before yielded very good results. Thinking the Army more credible than professional education researchers because it would care about results and probably was not wedded to any particular educational theory, I decided to try what my colleague suggested. Since then, I have given quizzes in groups of two, a few days apart, both on the same material. On the first quiz, students find out what they don't know, and usually they learn much of it in time for the second quiz. Students get the higher of their two grades.


All this has worked. My students (our school is not a gifted magnet) scored by far the highest in the Seattle district on the AP Calculus AB test from 2008 to 2012 (and possibly before that, but I don't have the data). I taught AP

Calculus BC (but not AB) in the 2012-2013 school year, the first year our school offered the course. My students once again scored the highest in the district. In the 2011-2012 school year, I taught Algebra 1, the only year I taught a course for which the state has an end-of-course test. My students scored higher than those of any other teacher in the district. (I have the data to back this up; the AP data is by school and not by teacher, but the Algebra 1 data is by teacher for every school in the district.)

There are issues other than "reform versus explicit" math instruction that contribute to the lack of proficiency in math among our students.

We tend to put students in classes where they cannot do the work. Supposedly we are "challenging" them. But they need to be challenged in class where they are able to succeed! Passing kids who can't do the work from class to class doesn't really help anybody. Years ago, our school wouldn't allow a student into a math class without the recommendation of the previous year's teacher. That went by the wayside. Now, a student who passes any course can get into the succeeding one (or even into the Honors or AP version of the next one) merely by signing up for it. Virtually every student who passes a course now signs up for the next one (unless it's not needed for the student's graduation). The number of students unable to do the classwork has increased. I have tried to make my grading system align to this and to make a passing score indicate that a student knows the material well enough to move on. This doesn't work perfectly, though, and some of my students who should not be admitted to the next class do get in.

Teachers are supposed to handle this using "differentiated instruction," where each student is taught at an appropriate level for that student and where teachers take into account each student's "learning style." This doesn't work; to a great extent, it's just not doable. In math especially, teachers need to have students whose abilities are within a reasonable range. I now have some classes where abilities range from fourth grade math to beyond the level of the course. Both the more advanced students and the lower-level students are being cheated. I can help the more advanced ones by seeing that they get into a higher-level class next year. There's not much I can do to
help those far below the level of the class; they will fail and have to repeat the class next year, and they won't be prepared for it next year either.
Our school now puts every incoming ninth grader into Algebra 1 or higher, and some middle schools do that for eighth graders. This is absurd! We're almost guaranteeing failure!
I sometimes hear from teachers that the great majority of our students are doing just fine and that most of our resources need to be devoted to "struggling" students. But it's not true that most of our students are doing just fine! Why does the U.S. lag far behind many other industrial countries in our students' math achievement? Getting decent grades in our high schools is no guarantee that they are doing "just fine."
Parents and teachers can change things. Where's the Math?, with a membership consisting mostly of techsavvy parents unhappy with the inferior math education their students were experiencing, brought about much change statewide. Mostly due to pressure from us, the state legislature required Terry Bergeson, then superintendent of public instruction, to rewrite the state's miserable math standards. When the rewrite was shown to be little better than the standards to be replaced, the legislature took the job away from her and gave it to the State Board of Education, which in 2008 produced some really good standards. All this contributed to Bergeson's defeat in her campaign for reelection that same year. In Bellevue, the school board, after much lobbying by Where's the Math? members, adopted really good textbooks. Now a procedure for adopting new K-5 textbooks is underway, and we hope to see textbooks selected that are a major improvement over the "fuzzy" texts currently used.
I retired from the Coast Guard in 1995 after 30 years of service. My military retirement pension was (and is) very nice. I didn't need a whole lot of additional income, and I thought that teaching was something I would enjoy (and could afford, the starting salary of teachers being minimal). Having heard since I was in college in the 1960s that schools of education were among the least demanding of all institutions of higher education, I decided to enroll anyway since I needed my certificate to teach. The practice teaching was indispensable; I was blessed with two wonderful cooperating teachers, and that got me off to a good start.
The military pension gave me the courage to violate school policies that I thought harmed kids. The worst that could have happened was that I could have gotten fired, but that would not have been a catastrophe and was worth the risk. But nobody has ever tried to fire me

or even try seriously to induce me to change my ways. I'm grateful for that. But I'd be even more grateful if the school district would pay attention to the results my students have achieved and use those results to influence their policies.

I'm retiring from teaching, but not from Where's the Math?. I intend to keep on working toward better math education for our kids.


AAE member Ted Nutting is retiring this summer after seventeen years teaching math at Ballard High in Seattle. For the preceding thirty years, he served in the United States Coast Guard, retiring as a captain. He lives in Seattle with Maureen, his wife of 39 years. They have four adult children and two grandchildren.

# More Educators Think "Just the Right Amount" of Time Is Spent on Testing 

Asurvey released last month finds that teachers and administrators are looking more favorably than they did two years ago on the amount of time that students spend taking tests, and teachers spend preparing for them.
That's one of the surprising findings in the Northwest Evaluation Association's (NWEA) new study of educators' attitudes toward assessment. While most teachers still think too much time is spent on testing, fewer think so than compared with 2011, the last time the Portland, Oregon. based nonprofit did the survey. Two years later, more teachers think "just the right amount of time" is going into assessments.
The trend is the same when the question is put to administrators, but the numbers are even more dramatic. Compared with the last set of NWEA findings, the number of administrators who say that students and teachers spend too much time on testing has dropped by doubledigit percentages.

The study was based on twentyminute online surveys conducted last month with a nationally representative sample of $1,004 \mathrm{~K}-12$ teachers, 200 administrators, and 1,040 students in grades 4-12.

Students turned in some surprising responses when asked about their experience with assessments, too. More than 90 percent-even
at the high school level-agreed that tests are "very important" or "somewhat important" for a halfdozen purposes, including helping their teachers chart their progress, understanding what they're learning, and setting goals for learning.

Think students don't understand much about tests and how they're used? Check out this next finding. They showed a striking ability to differentiate between what classroom tests are used for and what year-end state accountability tests are used for.

In the survey, students, teachers, and administrators all said they found classroom tests far more valuable to them than year-end state tests for accountability. When asked what kinds of supports or interventions accompanied weak results for the two kinds of tests, students reported that classroom tests were far more likely than state assessments to bring before- or afterschool sessions, small-group support, or other extra help.
"Fifty-four percent of teachers and 89 percent of administrators said that the ideal focus of assessment should be frequently tracking student performance and providing daily or weekly feedback in the classroom," the study says. Eighty-nine percent of student said that tests results aren't very helpful to them or their teachers after more than one week.

Accordingly, one of NWEA's policy recommendations, based on

the survey results, is to reallocate federal, state, and district assessment spending on the kinds of tests that inform teaching and learning.

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