

Math quest

Cultural appreciation of math's beauty would fuel students' desire to learn it

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BY GLEN WHITNEY

There was a lot of discussion this summer about the big decline in third-through eighth-grade students achieving proficiency on the state math exams. The drop occurred after the state raised minimum passing standards to give a more accurate picture of how children are doing.

With the new school year now under way, it's important to acknowledge that students aren't achieving as well as we'd like in mathematics. That's a real problem with societal consequences. We need our kids to grow up to be mathematically able and engaged adults — especially as the increased role of technology in our lives demands that we have a technically able workforce.

So we have to understand why students are having problems with math. There may be a lack of early identification and intervention for students struggling in the subject, as well as a growing prevalence of math anxiety, and a lack of attention to the different learning styles that students may have.

But there's another factor, too: lack of motivation.

Kids learn best the things that they want to learn. In too many cases, the only reason students take math classes is to pass the Regents exams — so they can graduate from high school. That's thin motivation for truly getting excited about math. The Regents exam, ideally, should just be an independent verification of achievement inspired by other, less artificial reasons to learn math.

But what would those reasons be? One is the usefulness of math. Yet although it's im-

portant for kids to see how mathematics is connected to other human pursuits and to the fabric of everyday life, relying on utility alone to drive mathematics study can lead to a sort of trap.

"When will I need to add fractions?" "Why would I ever actually want to calculate the sine of an angle?" These questions can become a refrain, and the truth is that Johnny or Celia just might never need to factor a polynomial. In stressing standards of utility, the intrinsic appeal of doing math is lost.

When kids study "Romeo and Juliet" in school, the beauty and structure of the language are celebrated — and not tied to any questions of usefulness. It might be difficult to believe today, but in many eras and cultures, people pursued math for its pure joy: the satisfying challenge of an interesting problem or puzzle, the excitement of discovery, the thrill of exploration, the beauty of patterns and numbers and shapes.

In 19th century England, leading mathematicians wrote popular books and gave well-attended public lectures, and there were numerous mathematical newspaper columns. From the 17th through 19th centuries it was a common practice in Japan to devise and beautifully illustrate geometric puzzles and solutions, and hang the results as temple decorations.

Indeed, the classical "liberal arts" were traditionally seen as the subjects one should study to better oneself and for the pure joy of knowledge: grammar, rhetoric, logic, arithmetic, astronomy, music and geometry. It's telling that

math comprises not just one but three of these: logic, arithmetic and geometry.

Of course this notion of the liberal arts was the product of a different culture than we have today in America. So perhaps one of the most significant problems underlying poor math education is that math doesn't play a visible role in our culture — it isn't held in high esteem.

A key solution would be to create cultural institutions, places that can help people rediscover the beauty, relevance and excitement of mathematics. We need more places with physical and interactive manifestations of the exploratory nature of mathematics, lecture series that provoke thought about the role of mathematics in our lives, galleries for mathematical art, and groups that kids or adults can belong to that celebrate mathematics. A lecture on the vital role that math plays in our national security, for example, could be an engaging eye-opener for audience members who may come in with the attitude that math is irrelevant or disconnected from the "real world."

There are already a handful

of intersections between math and our popular culture, from the wonderful "Mathematica" exhibit at the New York Hall of Science in Queens to the show "Numb3rs," which enjoyed six seasons on CBS. But we need new, fresh options. Indeed, my colleagues and I are engaged in the creation of a new institution: the country's only museum with math as its central theme. The Museum of Mathematics is scheduled to open in Manhattan in early 2012.

What can be done more immediately? Society bombards us with messages underscoring the importance of reading to kids. Research has shown that the amount parents read to their children correlates highly with language achievement. Nobody questions the importance of creating a culture of reading. But we receive no such messages about mathematics.

We need to create a parallel culture of math, and parents and grandparents can start by engaging kids with math whenever possible. Have them help you find the arrangement of mugs on your shelf or suitcases in your trunk that fits the most in. Have

them help you double a recipe or cut it in half. Give them puzzles or geometric toys or construction toys to play with. Have them work on a sudoku or kenken puzzle. Discuss patterns and symmetry in the items around you — floor tiles, flower petals, buildings. Ask them to guess the dimensions of things around the house and then check by measuring. Look for different geometric shapes in the world around you as you travel. Convey the wonder of some of the visible mathematical wonders in our world — the graceful curves of the Golden Gate or Verrazano bridges, the St. Louis Gateway Arch.

These are just a few ideas, but there are many others ways to engage kids with math; watch out for them. That engagement will sow the seeds of future achievement and, one hopes, put the Regents exam back in its place: as a mere double-check that all is well with our mathematical culture.



Glen Whitney, executive director of the Museum of Mathematics, is a member of the Three Village school board.

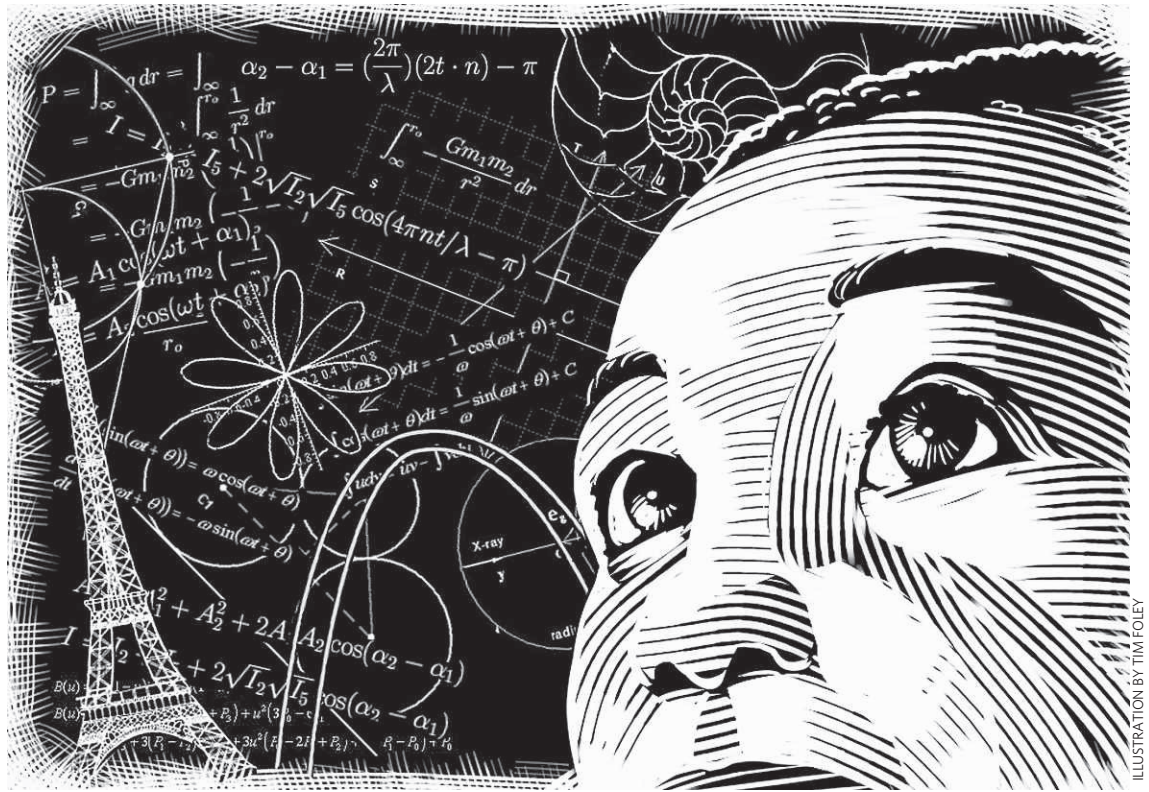


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