

Math: Do We Really Need It?, Part I

By Kate Stoltzfus - March 11, 2016

When political science professor Andrew Hacker first proposed that algebra wasn't necessary in 2012, the education world was quick to respond. His controversial opinion piece in *The New York Times* sparked a debate, drawing hundreds of comments from educators, parents, and former students.

In the recently published *The Math Myth and Other STEM Delusions* (The New Press, March 2016), Hacker, a professor emeritus who teaches at Queens College, City University of New York, expands on his argument to eliminate high-level math requirements for all students and rethink our fundamental approach to teaching and learning the subject. By imposing this curriculum—Algebra 2, geometry, trigonometry and calculus, as well as its testing—upon everyone, he asks, do we take away from developing students' other talents?

Those who agree with Hacker share trials of flunked math courses and testify that higher-level math was not critical to every career's success. Other readers—past and present—think Hacker has the wrong approach. Even if students won't use math directly in careers, the subject is a crucial basis for learning. Back in 2012, psychology professor Daniel Willingham argued that to stop requiring math might increase the achievement gap for low-income students.

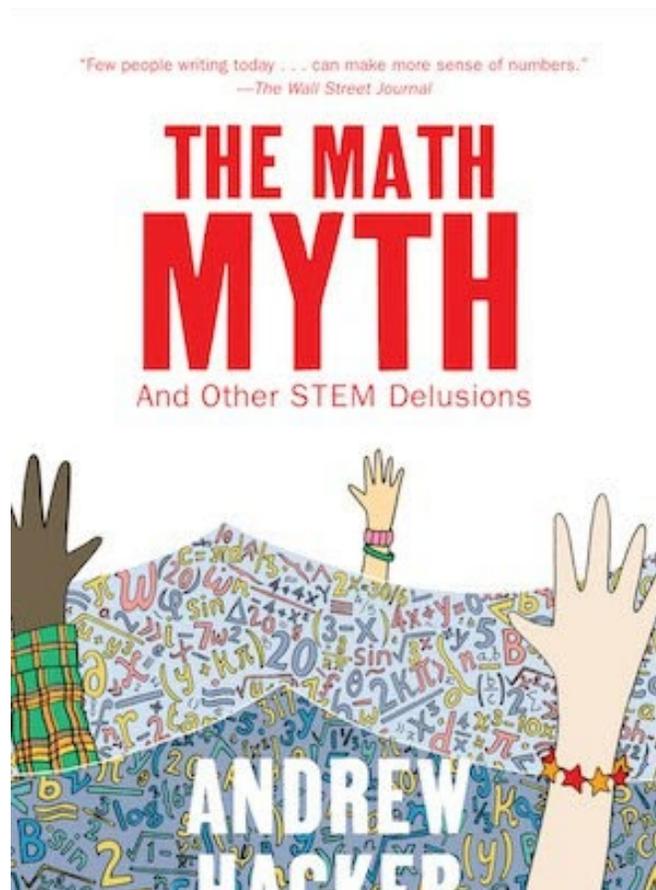
While Hacker is quick to assert the importance of mathematics (and teaching algebra), requiring advanced math at a standardized level in order for students to graduate high school sets them up to fail. He views it as the main academic reason many students fail a class or drop out of high school. There are few jobs, he argues, that use the concepts of advanced math on a regular basis. *The Math Myth* also questions the push for STEM skills and the Common Core State Standards for its "one-size-fits-all" approach. Kevin Devlin, executive director of Human-Sciences and Technologies Advanced Research Institute at Stanford University recently critiqued Hacker's claims, saying he misunderstands the common core.

Hacker advocates instead for numeracy—an advanced arithmetic curriculum with an emphasis on real-life situations. He argues that it prepares students to become adept with daily number use. To practice what he preaches, Hacker started a Numeracy 101 course at Queens College in 2013, teaching quantitative reasoning, statistics, and advanced arithmetic. *The Math Myth's* final chapter includes samples of such problems.

It cannot be disputed that math is challenging for many learners, and that the failure rates for the subject are high. (In one of the more extreme examples, 57 percent of students in Montgomery County, Md., failed Algebra 2 in 2013.) As *Slate* writer Dana Goldstein asserts, the book is a comforting one for those who struggled with math. Goldstein agrees that it's a good idea "to give students multiple math pathways toward high school and college graduation—some less challenging than others."

Recently, BookMarks caught up with Hacker by phone to talk to him about why he wants to change math instruction.

Photo credit: The New Press



Math: Do We Really Need It?, Part II

By Kate Stoltzfus - March 14, 2016

Andrew Hacker is the author of *The Math Myth and Other STEM Delusions*, published this month by The New Press. Hacker, an 86-year-old professor emeritus of political science at Queens College, City University of New York, examines the current approach to math instruction and testing. (Read more about the history behind *The Math Myth* in our introduction.) He says we're teaching math all wrong. BookMarks spoke to Hacker by phone to hear about his ideas.

BookMarks: You've been a professor of political science for many years. Why take on math?

Hacker: I've written quite a few books—*The Math Myth* is my 10th—on broad subjects like race in America or wealth or gender. But all the way through, I was just bothered, almost like a small bee in the bonnet, at the fact that we require a whole menu of mathematics from every single American young person. Right now there are about 4 million 14-year-olds and every single one has to be taking a class in algebra. I regard it as something entrenched and irrational. So you can ask a simple three letter question: Why? Let's ask the people who impose this regimen to defend it.

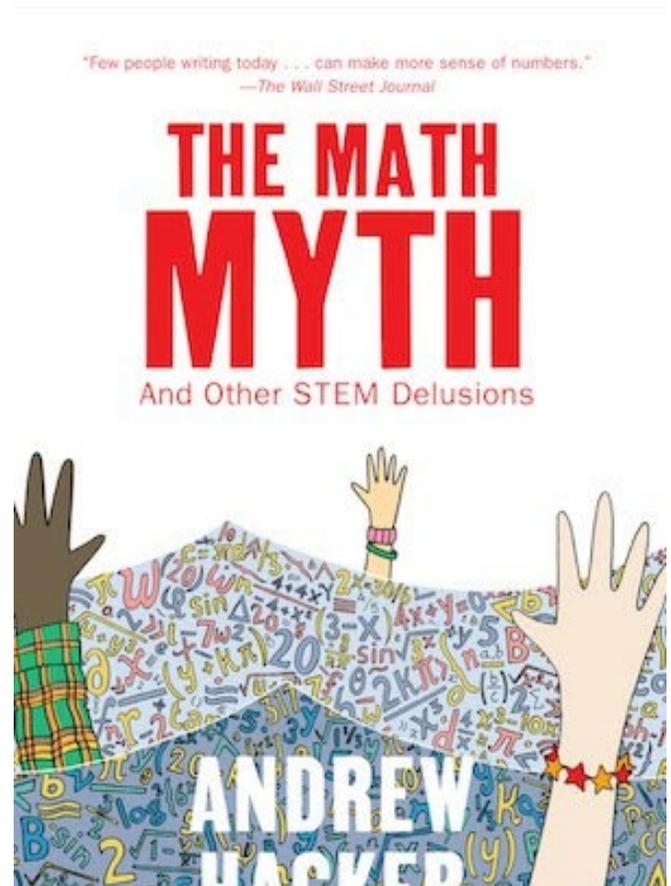
BookMarks: *The Math Myth* calls for the reform of a subject that has long been seen as standard curriculum. Why do you think it's such an irrational concept to teach all 14-year-olds math?

Hacker: Because what we're talking about is algebra, trigonometry, and calculus. I'm enough of an intellectual to know and honor mathematics as one of the great callings of human beings. But mathematics, especially as it is taught in our schools, is taught in a kind of locked room. It's not about the real world. It's about a universe of its own. You just solve a geometric problem for its own sake. I'm wondering why we impose a sphere of knowledge, which is in a world of its own, another planetary orbit, and I don't see a reasonable defense for it.

Hacker Math Myth cover.jpg

BookMarks: So your book set out to answer that question, "Why?"

Hacker: I want to propose other options and alternatives. In particular: teaching instruction on numeracy, quantitative reasoning, literacy, and becoming agile with numbers as they apply to real things. Whether it's measuring the number of days in a year, federal budgets, annual corporate reports, or how much would it cost to pay for a new kind of health plan, there's a real need for average citizens to become much more adept with numbers.



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We teach arithmetic up through grades 5 or 6, and most people can handle addition, subtraction, and long division. But then we immediately jump them into middle school algebra, then geometry, trigonometry, and onto calculus, and what we don't have in the middle is getting more sophisticated with arithmetic.

BookMarks: Some argue that not requiring advanced math would allow students to stop challenging themselves or that it might further increase the achievement gap for students who are already struggling in school or who are from lower income homes or schools. What's your response to this?

Hacker: I would be the first to admit that advanced math is very challenging. Just go into a room and watch kids taking a test in geometry. Their brows are furrowed, temples are damp, fists are clenched. But we come back to my question: If you want challenges, why just focus on math? Poetry can be challenging; history can be challenging; political science that I teach in the other half of my time can be challenging. This numeracy class that I created [at Queens College in 2013]—Numeracy 101—I've been teaching in an experimental way.

The students in it have all had high school math and told me that my college numeracy class is just as demanding as a calculus course they took. So if we want rigor, if we want students to be challenged, math is not the only way to do it. For example, mathematicians will tell us that if you wrestle with geometric proofs, you'll learn something very important: how to prove something. Yes, you learn how to prove a theorem in math. But it does not help you at all with proof in the real world.

BookMarks: How were your theories implemented for the college classroom in the Numeracy 101 course you taught?

Hacker: The closing chapter of the book gives about a dozen examples of the assignments I gave in Numeracy 101. (For example, there are two tax returns filled in two ways and I ask, Which is the honest return, and which is the cheating return? In another example, I point to the state of Pennsylvania and show how many members of each party ended up winning congressional seats as opposed to the number of votes each got. And one of the parties got many more seats than its votes might have warranted.)

I want the students to become agile with numbers, to have numbers as a second language. What I've been doing can be applied at the middle school and high school level and maybe even earlier. What I'm doing is more fun than mathematics. There is still a bit of the Puritan legacy that says if that anything in education is enjoyable, it's probably a low grade of education.

This interview has been edited for length and clarity.

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