

# The Synapse: Intercollegiate science magazine

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Volume 11 | Issue 1

Article 15

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2016

## Reforming Mathematics: Why are People Scared of Math?

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### Recommended Citation

Meldrum, Oliver (2016) "Reforming Mathematics: Why are People Scared of Math?," *The Synapse: Intercollegiate science magazine*: Vol. 11: Iss. 1, Article 15.

Available at: <https://digitalcommons.denison.edu/synapse/vol11/iss1/15>

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# Reforming Mathematics

*Why are People Scared of Math?*



Written by Oliver Meldrum

Illustrated by Jack Bens

**H**ave you ever felt uncomfortable with math? What about frightened? If you answered yes to either of those questions, you are not alone! Earlier today, as I was working on a problem set for a math class, someone sitting next to me quite literally hid behind their computer in order to avoid even setting eyes on the strange symbols we call “math.” Now obviously this was

intended to be humorous, and one person’s fear of a subject is not cause for large scale concern. However, this problem doesn’t start or stop with one person. Rather, their fear is born out of, and is indicative of, a much larger problem that has existed for a long time throughout the country. This is particularly evident by the way that so many people self identify as “I’m just not a math person” or even “I hate math.”



The idea that someone doesn't like math may not come as a surprise to you. However, if I was to say "I hate reading," or maybe, "I'm just not a words person," or perhaps "I just don't get why anyone would study art," that many would consider these statements strange, especially coming from a college student. Why then is there a difference here between hating math and hating other subjects? The answer is not well agreed upon but I argue that it's a result of a misunderstanding of the subject of math itself.

Many people have written about this issue but perhaps the most enthralling one to do so was Paul Lockhart in his article and subsequent book entitled *The Mathematician's Lament*. In this book, he compares the current state of math education to music being something that "music people" studied in the form of theoretical exercises and where only the best and brightest college music majors could gain the title of "musician." Only these dedicated college students would ever get the chance to listen to music, a oddly different perception of the purpose of music than we are used to.

This can also be applied to visual art. Imagine if children in preschool, instead of drawing to their heart's content, were forced to memorize facts about how colors would mix together, or to color in arbitrary shapes in order to "start with the basics." Do people physically hide from music or paintings? Of course not: it is a source of enjoyment even for those who don't have an advanced degree in the subject. Again, we ask ourselves the question: "why is mathematics different?" One way of looking at this difference is by examining the perceived purpose of mathematics. It is seen as a "tool for science" whereas art is seen to have value in itself. The way we treat math is comparable to thinking that the purpose of drawing is to help detectives solve crimes or to draw blueprints. Although math may not be on the same level of artistic value as music or painting, it should be much closer to that end of the spectrum than it is currently.

Simply stating that math is an art form isn't going to solve any problems. It might not even convince you that there actually is a problem. The problem lies in the fact that math, and related things like logical reasoning, are valuable for life, not just for better understanding the sciences. Why is calculus, a subfield of mathematics which is so unrepresentative of most of mathematics, the focus and end goal of so many students' "math" education? It is arguably the tool in mathematics that is used the most in the sciences and in other fields. As a result, for many people it has come to symbolize the end goal of our mathematics education: a tool to better understand other subjects. I am not arguing that calculus is important for everyone's life. Rather, our focus on calculus is perpetuating the problem: it's the enjoyment that comes from understanding the beauty of mathematics and the usefulness of deductive logic that should be stressed when educating our students.

One major reason why people don't like math is that the mathematics education system is broken. A major issue is the way that math is presented. So many mathematics teachers generate and continue the idea in students minds that math is simply an algorithmic task. Because it is not taught at all as an art form, devoid of what makes math beautiful, it comes across as something that students grow to despise. It is almost impossible for students to learn something that they despise, or don't want to learn. Consequently, math students fail to understand the material at a particular level and because math builds upon itself to such a high degree, they are sucked into a negative feedback cycle of hating math and believing that one isn't "a math person." In reality, a complete overhaul of the United States' math education system diverting teaching focus away from calculus and inspiring the general public to go to math museums and listen to math radio programs is not going to happen in the near future. However, there are many things we can do to move in that direction.

Perhaps the most important change is one that is not specific to math, but may affect math the most. This is the way that we treat teachers in our society and the result that that treatment has on the quality of teaching. One important step is to make teaching a more valued career option. Many of our best teachers move out of the classroom, into roles such as principals, textbook writers, and other more administrative and well-paying roles. These are without a doubt valuable positions, but if the most skilled and inspiring educators aren't physically in the classroom where they can arguably make the biggest difference, we and our students are suffering. In addition, the strong tenure system in place in many states and school districts has decreased the quality of teaching. Many teachers that have continuously been reported as being ineffective and simply bad have kept their job for another 20 years, ruining years of mathematical minds. This is especially prevalent in the area of mathematics where the supply of strong math teachers is extremely limited. Many of the teachers are unqualified to teach math in an effective way because they have little to no real grasp of what math really is or should be. If teachers think about math as an algorithmic task, then their students have little chance of breaking out of the cycle. In other words, we need to increase the standard of teaching and this should be done not through increasing standardized testing, but through providing students with the best teachers possible.

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Another perhaps more manageable step in restructuring our math education system is to change the ways that teachers teach. There are many people and organizations already doing this. For example, there is an organization called the Coalition for Essential Schools which has been seeking to implement newer ideas about education such as "teacher as coach" and "learning to use one's mind well." These principles along with eight others are what they call the Ten Common Principles. These seek to change the classroom into one that is much more supportive of students and conducive to real learning and enjoyment.

Math education also plays into things like systemic classism, enjoying oneself, and making reasoned decisions about many aspects of life. The Algebra Project is seeking to implement social justice reform through the teaching of algebra. It sees this mission as analogous to the civil rights movement and argues that access proper education is similar in many ways to the right to vote. It is working to increase class mobility and access to well-paying careers by teaching algebra, the basis of much of math, in a way that helps students think about math in a more positive and constructive light.

Why, then, do so many people not like math? The answer is incredibly complex and no single person or policy will fix it. It's going to require many people working to create a better system that prioritizes different aspects of math and in general simply making math *more fun*. When professional, research mathematicians are asked what math is, they are likely to give answers about understanding structure, finding deep connections, and exploring really beautiful objects. This may sound pompous and fanciful, but does it not sound more fun than how a typical high school student answers: memorization of algorithmic tasks such as adding fractions? Obviously it's not the fault of any individual for disliking math or not understanding the beauty of it, but maybe if we all try and be a little bit more open minded about it, we can slowly reduce the stigma. ●