

Finding the Glory in the Struggle: Helping Our Students Thrive When Math Gets Tough.

By Suzanne Sutton

"A man's reach should exceed his grasp. Or what's a Heaven for?"

- Robert Browning

Anxiety accompanies mathematics discussion these days, as if the two are naturally linked. Parents, teachers, administrators, and students are involved in the struggle, but no one is smiling. And none are pleased with the performance of the others. Scores drop, anxieties soar, blame circulates, and this subject suffers ignominious bad press. There's a better way to get where we are going.

We are, after all, headed in the same direction. But there's some confusion about who is responsible for what. What should we expect of students, what of teachers, what of administrators, what of parents? We ask our parents to be involved, but they're not sure how. Curriculum writers analyze and create thoughtful adaptations to meet the changing world; teachers struggle to learn new methods and new technology to make these changes. Students struggle accompanied by a nagging sense that the train is about to slip away from them at the next junction. And parents watch from the sidelines, feeling ill-equipped to do more than monitor homework and grades and hope for the best. "I'm not good at math," they tell us, "but my child must be."

Do they? Do our young people really need math?

The standard answer is "of course, look at our changing technological world." But the secret, seldom spoken response to the answer is, "That's exactly why I don't need it. Machines can do it all for me. And besides, I'll never be an engineer." So students opt out, sitting in classrooms going through the motions, making it from one test to the next, getting by with the bare bones minimum, never wondering about the questions math can answer so elegantly. Curriculum planners and textbook authors change the standard path to include more real world connections, but youngsters still don't connect. Their understanding is shallow, just enough to get math, and they're not sure they really want to.

But it is not to be engineers that our students need math. And while the changing technology of our world is indeed one rationale for developing mathematical skills and knowledge, there is an even more compelling reason. Ultimately, math comes easily to no one, and therein lies its glory. It is precisely in this struggle that math offers the most to our young people. In their struggle to understand, and in the manner in which they meet this struggle, they can learn life skills far removed from the classroom or the engineer's drawing pad. Mathematics offers them an opportunity to learn how to work through the struggle, how to bring to it what they have, how to find and use the things they need. But this struggle is too often misinterpreted, and agony results.

Struggling in mathematics is not the enemy, any more than sweating is the enemy in basketball; it is part of the process, and a clear sign of being in the game. Math asks our students to think in ways they are not used to thinking. They will be asked to look at the obvious in ways they're not accustomed to, and then we'll ask them to explore the not-so-obvious in similar ways. A rigor of thinking and clarity of expressions is demanded that will stretch them beyond familiar styles. Much of this will require abstracting and reasoning beyond what they know. It will also require an honest pursuit; there really are no shortcuts.

But for this effort, it provides so many rewards. Math does not hide its mysteries; they are there for anyone who seeks them. The rules are the same rules for all; the inner consistency of mathematics makes it possible for children to enter on any level, and find that the same principles and properties they learned in one grade follow with them to the next and the one after that. There are no tricks, no special rules for some and not for others. Math, by its very nature, is principled.

Because it is tough, because it is honest, and because it is principled, the rewards it offers to those who persist in the struggle go far beyond the concept that is mastered. Watch a youngster that has stuck with the struggle and come to a real understanding of a mathematical concept on his own

efforts. He can conquer the world, and if you tell him otherwise, he simply won't believe you. He knows what he has done, and he knows that if he can do that, he can do anything.

With a little reframing of the way we present the struggle, we can offer this experience to so many more of our students.

Parents

Parents are anxious. The world that faces their young people is more frightening and more competitive than ever. They know that success in math is critical to success in that world, for entry into colleges and careers, for advancement and for choices. But they're not sure what they can do to help. Other than helping with homework or reminding their youngsters how important math is, they don't know what to do. When the homework gets beyond them, or when their children disconnect, parents' tension escalates. Conversations about math become tense, between parents and children, parents and teachers, and parents and administrators.

And yet, without knowing a factor from a function, parents can be a significant force in ensuring mathematical success for their youngsters. The parent, more than anyone, is in a position to help the student engage in the struggle of mathematics. We can let parents know more about the nature of mathematical learning, and the struggle involved. We can let parents know they don't fear the struggle, that it is an essential and important part of learning mathematics. We can give them information about the struggle to help them guide their children through it, without feeling a need to avoid it, or take it on themselves. We can allay their panic.

If the parent accepts the struggle, the youngster can. And even more important, if the parent values the struggle, and sees math as more than just a series of right answers, the young person can approach mathematical learning in a way that will not only make success in mathematics more likely, but carry over to pursuits far beyond the mathematics classroom.

Practicalities

All students benefit from meeting the struggle that mathematics presents. Yet, even for strong and healthy young people, the struggle can be uncomfortable. They need help in, learning how to do it. We can help them by letting them know it is okay to struggle, and by helping their parents understand the struggle, too.

We can help parents, clearly and directly, in the following ways:

Let parents know the struggle is okay, that it takes time to learn things, and multiple passes through the same material are often necessary.

Parents can help students understand that they are not expected to get it all right or understand it all clearly, the first time. With this message and this acceptance coming from parents, students can relax enough to learn new concepts. If parents believe their struggling means stupidity or shirking, students feel a tension that gets in the way of leaning. If sweating is okay, athletes are really free to get into the game, but it is viewed as undesirable, they must tread too carefully to be effective.

Students need to take responsibility for their own learning and their own struggle.

Parents encourage responsibility by becoming aware that mathematics is supposed to be a struggle. Believing, erroneously, that math learning comes easily to some and not to others results in an attitude of "why bother? I'll never be good at this," when the subject becomes unclear. If students expect to encounter confusion we can help them see that the way through that confusion is application of effort- their effort. Parents need to encourage their youngsters to struggle through to understanding, to dig in when it gets tough, not flee into excuses.

Parents should resist the very common temptation to explain the struggle as an in-born difficulty in mathematics, genetics or otherwise.

Parents should not say “I was never very good at math either.” There are many aptitudes that carry one into and through mathematics. Our young people have enough of what they need to make it. The goal is to help them learn how to use what they have to meet the struggle, not to fear, avoid, or abandon the struggle from a belief that they cannot do it. When we hit the wall, we all are almost certain that we cannot make it. Parents can help a youngster believe and discover that he can.

Offer parents information that will help them guide their young people to resources that can help.

Show parents how to use their student textbook to understand what is going on in the course, without needing to understand the math involved. When they learn what good resources textbooks can be, they begin to see how to help their children use these books as more than repositories of homework questions. The answer to “where can I go for help?” is often sitting in the bottom of a backpack. What a relief it is for parents, and what a valuable lesson for students to discover that answers come not from magic, but from reading and thinking and struggling to understand a sentence, or an equation in a book they have ready and available.

Homework provides an opportunity for students to meet the struggle of mathematics learning.

Alone and unhurried, they can discover what they know, and dig to find what they don’t know. They can try problems like the ones demonstrated in class, and stick with them as the methods and ideas come clear. They do this on their own, and in the process the learning becomes theirs. When parents understand the value of math homework, and the role it plays in the student’s learning, they can guide, model, and encourage their children to do more than just “get the homework done.” Homework belongs to the students, and they can esteem it as they do other things of value. If parents actively praise and value the effort of their youngster makes in pursuing understanding, the youngsters gets the message that the struggle is important. They can feel a pride and confidence that is significant, even when understanding is slow in coming.

Expand the focus beyond the grade.

Grades and tests too often become battlegrounds and sources of great conflict in a student’s journey through school math. Focusing only on the grade generates a terrible tension and sends the wrong message. It can seem that the only thing that matters is the outcome, not the quest.

Of course the outcome is important, but we can help parents see that what will be most important is how the student chooses to meet the struggle in mathematics. Then can then see the bigger picture. Overemphasizing the grade too often results in negative behaviors to get the grade; the student undervalues the struggle and looks for shortcuts. Rather than learning responsibility, or the confidence that comes from struggling through his or her own efforts, the student seeks quick fixes.

Praise the process.

If students are in the game, working at it, struggling and coming to understanding bit by bit, let them know how great this is! Both parents and teachers can send a message to students that this is what doing math is all about, and that they are doing it very well. Young people want to understand, and they want to see themselves as successes in math. If we can expand their view beyond the grade at the top of the test, their anxiety will decrease and they will learn to see success as something they can control through their own efforts.

Conclusion

Learning mathematics remains a struggle at some level for all of us. But rather than seeing this struggle as something to avoid, we can see the struggle of mathematics as one of the most valuable things offered to our students. The manner in which they meet this struggle will teach them lessons that extend far beyond the classroom. From it they can learn, in a safe and structured environment, how to meet challenges through their own efforts, how to own and manage the challenges presented to them. Regardless of their perceived aptitudes or gifts in mathematics, they can learn that they have within themselves what they need to meet this challenge.

Parents can be enrolled in the process of encouraging students through this struggle. They need to understand the nature of math learning to know what is normal, what is glorious, and how they can help. They will be relieved to discover their youngsters can succeed in mathematics whether they themselves can factor a polynomial or define a logarithm. Understanding the value in the struggle lets them encourage their sons and daughters to meet the challenge, rather than fear it, or avoid it, or seek quick fixes. This understanding enables them to help their youngsters learn, and offer us a better chance to teach them.

Children can learn many things in school, beyond the factual information we impart. From their experiences they generalize the learning to encompass not just what they've learned. But how they've learned. Life will present them with struggles, whether we wish this to be so or not. Maneuvering through struggles in school, young people learn how to meet challenges for which there is no map, and no shortcut. How they approach the struggle of mathematics will affect how they approach the struggles they will encounter in life.

The opportunity begins when the struggle begins.