



The Fear of Math

Five strategies to help students conquer their math anxiety.

BY LEAH SHAFFER

MATH IS A LOT LESS SCARY when you have a “fearless frog” at your side.

To help her students feel less anxious about math, Jennifer Laib used a toy stuffed frog to talk about math fears. The K-8 math specialist at Driscoll School in Brookline, Massachusetts, asked second-grade students what it meant to be “fearless” in math. Students offered up concepts like “Ask questions” or “Believe you can do it.”

When students modeled those fearless traits, they were allowed to hold the fearless frog. The result: Kids were excited at the prospect of learning from their mistakes in math instead of fearing them.

Turning fear around can make a major difference in how students learn, especially if you catch it early.



MATH ANXIETY

Research has shown that math anxiety can develop in students as young as age 5. That anxiety can use up working memory capacity, says psychologist Elizabeth Gunderson, shutting down the very part of the brain children need to learn and master math. And these early negative math experiences will only worsen with time.

"It almost seems paradoxical that those people who have the best memory capacity are actually most negatively affected by anxiety or pressure," says Gunderson.

Wherever your students fall on the math spectrum, it's important to understand the root causes of math anxiety and know how to turn things around with a few key strategies.

PROBLEM

KIDS SHUT DOWN WHEN MATH TIME STARTS UP

► Cultivate a growth mind-set

It's not difficult for Liz Stamson to spot the math-anxious students.

"They shut down," she says. "They don't work with other people in a group. They don't make eye contact with me."

A fifth-grade teacher at Forest Hills Elementary in Eden Prairie, Minnesota, Stamson sees it as part of her job to build students' confidence.

"We're helping them see that they can learn math; it's a mind-set."

The term *mind-set* refers to how we view innate ability. To have a "growth mind-set" means believing you can learn and grow in your abilities. A "fixed mind-set" holds that talent is just something you're born with. According to more than a decade of research first established by Stanford psychologist Carol Dweck, children with a growth mind-set achieve greater academic success. (Laib's fearless frog project is one way to address a student's mind-set about math.)

Encouraging a growth mind-set is not just about praising hard work. Teachers must be specific in their praise. For instance, Laib recently



Allowing for multiple pathways can help ease math anxiety.

Help students control their fears and frustrations by teaching them ways to reapproach a roadblock.

praised a fourth-grade student for how she organized her work and how that showed growth. Being praised for something specific gives students an anchor and "that makes them a lot less anxious," says Laib.

Another way to cultivate a growth mind-set: Embrace the inquiry-based nature of STEM. "Students with a fixed mind-set tend to avoid failure," says David Dockterman, an adjunct lecturer at the Harvard Graduate School of Education and chief architect of learning sciences at Scholastic Education. "STEM can help students see the value of learning from mistakes. You reflect, revise, and try again. We model that kind of iterative learning in MATH 180 [Scholastic's math intervention program]. Students need a classroom environment where learning from mistakes is the norm."

PROBLEM

STUDENTS VARY WIDELY IN ABILITIES

► Start from a place of comfort and build on that

To reduce math anxiety, teachers need to build on all of a student's strengths.

Julia Maier, a first-grade teacher at Stephen K. Hayt Elementary School in Chicago, has had to rethink how she approaches math. She starts each lesson with a warm-up "so kids enter the math lesson feeling confident."

Stamson often lets students choose their math partners. If she picks the partners, she remains mindful of students' strengths and personality dynamics. When you pair a math-confident kid with one who is more math-anxious, for example, both end up benefiting. A student who is confident



in math still needs to see a problem from multiple perspectives, Stamson notes.

"Everybody's learning from one another, no matter the confidence level," she says.

PROBLEM **AVERSION TO CERTAIN AREAS OF MATH**

► Allow for multiple pathways

Laib recalls how she worked with a second grader who was "miserable" about subtraction. She showed the student how to use an open number line strategy to find a solution. When the student realized it was okay to use this different strategy "that made

all the difference," says Laib.

In the past, says Stamson, she would show students how to solve a problem and then the students would practice it. Now, she presents the problem and students share how they came up with the answer.

"The students really become the teachers of the strategies they use and the procedures they follow," she notes.

Stamson will also offer a shortcut, or conventional algorithm, but she has one rule: "You don't use that shortcut until you feel confident that you understand how it works."

PROBLEM **THE NEED FOR SPEED**

► Offer multiple strategies to get an answer

The emphasis on speed is one of the leading causes of math anxiety, says math coach Rachel McAnallen, who has held workshops and consulted with districts across the country.

If students are stumped or panicked, they shouldn't think, "I can't do this," says McAnallen. Instead, help them

control their fears and frustrations by teaching them ways to reapproach a roadblock rather than freezing and wasting valuable time.

One way to talk to students about fluency is to emphasize it as an energy issue instead of a speed issue, agrees Laib. It's not so much about finishing in a certain time, but the ability to think around a problem.

Offer multiple strategies to get an answer in case a formula is forgotten, says Stamson. With flexibility in how students use numbers, they will naturally learn their math facts and get speedier at problem solving without the pressure.

"They don't get forever to solve problems, but they don't need forever," adds Stamson.

PROBLEM **KIDS THINK MATH IS BORING**

► Make math a game

If students are having fun, they'll forget to be fearful of math.

"The worst thing I can imagine is them thinking math is boring," says Maier, the Chicago teacher.

Making math fun can sometimes be as simple as incorporating the names of real people into math problems, as Maier does. Kids especially love solving humorous number problems with their teacher or principal prominently featured, she says.

You can also teach students how to problem-solve much like the way they might build a story. Try a number talk in your classroom by presenting a problem and having students solve it without pencil and paper. Once everyone has a solution, have them talk through how they got the answer and then illustrate all the different methods they shared (see an example at bit.ly/number_talk).

A simplified version of a number talk comes from McAnallen, who plays a game with students where they give their age without saying the number (for instance, "My age is 12 minus 4").

WHEN YOU'RE ANXIOUS

How to stop worrying and learn to love teaching math

Being anxious about math is not the same thing as being "bad" at it, says psychologist Sian Beilock, author of *Choke: What the Secrets of the Brain Reveal About Getting It Right When You Have To*. "Fearful reactions essentially compromise [the] ability to think," she says.

Just as it helps to give your students the time they need to learn new concepts, you should take the pressure off yourself to quickly master everything.

"Teachers are very impatient with themselves," says math coach Rachel McAnallen, even when they have loads of patience for their kids. "Give that to yourself."

McAnallen offers some lessons for the math-anxious at her website, zoidandcompany.com/cantdomath.html.

It becomes a competition among students to come up with creative formulas to yield the same answer.

Teaching in a way that cuts math anxiety leads to a new level of student engagement. As Stamson tried new ways to teach old concepts, the level of student interest went way up.

"Get out there and try it," she says, "and then watch what happens with your students." □

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