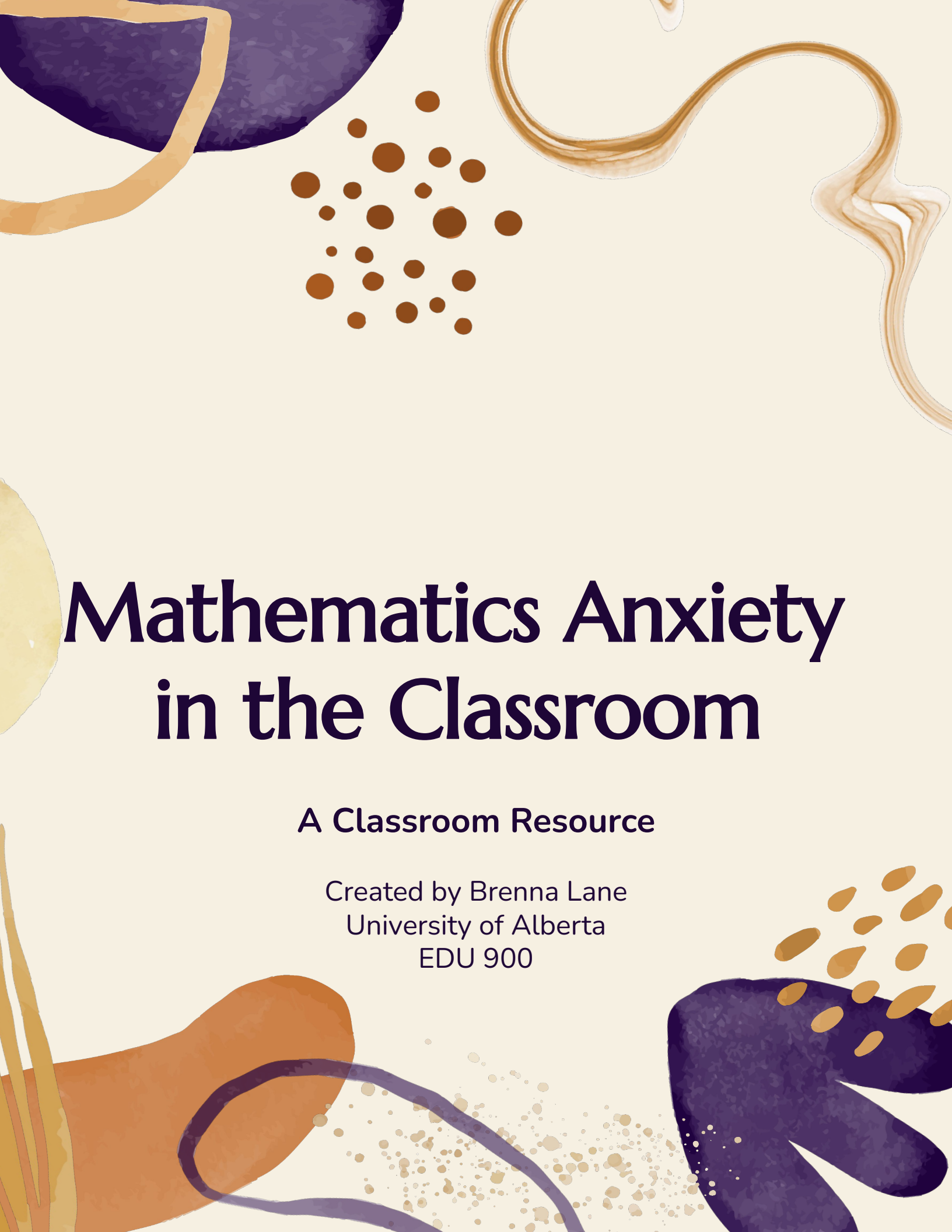




Mathematics Anxiety in the Classroom

A Classroom Resource

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What is Mathematics Anxiety?

*A feeling of tension or fear when
faced with numerical tasks*

Math Anxiety affects ~33% of 15-year-olds

Impact on Learning

- Limits working memory which makes problem-solving and critical thinking harder (or impossible)
- Can develop as early as age 5, often surfacing around age 10 (introduction of algebra)
- Higher math anxiety is linked to lower math performance

Role of Teachers

- Classroom activities and teacher behaviors strongly influence math anxiety
- Teachers with positive math experiences are better equipped to help students
- Teachers with moderate to high levels of math anxiety are more likely to pass along that feeling to their students

Supporting Students

- Encouraging collaboration and open discussions about anxiety can help
- Supportive and approachable teachers foster student success
- Focus on the process and less on the product to reduce student anxiousness of being wrong
- Be mindful of language when describing math tasks to students

In a world where it is socially acceptable to be anxious about math...

it's essential to be proactive about the teaching methods used in classrooms to reduce the pressure and stress placed on students (Beilock & Willingham, 2014). Recent studies show that about 17% of the general population experiences a high degree of math anxiety, and almost one-third of 15-year-olds report feeling nervous when engaging in mathematical tasks (Doz & Doz, 2022).

Teachers often rely on the same instructional methods they experienced in school. While this may feel comfortable and reduce their own stress, it isn't always effective, especially in math classrooms. "Math in many classrooms is based on a traditional skills-based model where memorization and rote recitation are taught more than active concept-based learning" (Geist, 2010, p.26).

Teacher attitudes toward mathematics and their perceptions of student ability consistently emerged as one of the most significant contributors to math anxiety across multiple studies (Atoyebi & Atoyebi, 2022; Finlayson, 2014; Geist, 2010; Jackson & Leffingwell, 1999; Letwinsky & Cavender, 2018; Ruff & Boes, 2014; Shields, 2007).

As math curriculum becomes more abstract during adolescence, the continued focus on rote memorization and "right or wrong" answers only heightens anxiety. This often results in declining self-confidence and, ultimately, **avoidance of the subject**. (Atoyebi & Atoyebi, 2022)

Long Term Effects of Math Anxiety

Math anxiety doesn't just affect students in the classroom, it can have lasting repercussions well into adulthood. As individuals with math anxiety move through life, they often develop avoidance behaviors that impact their professional and personal lives.

Avoidance Behavior

Adults with math anxiety may actively avoid situations where math is required. This could include avoiding tasks at work that involve data, not engaging in financial activities like budgeting or taxes, or even steering clear of social situations involving math. This avoidance can limit both personal and professional growth.

Finances

Math anxiety often results in poor financial management. Adults with anxiety may struggle with tasks like filing taxes, understanding deductions, or budgeting, which can lead to poor financial planning. They might also avoid investing due to a fear of making mistakes or not understanding the math involved, potentially missing opportunities for financial growth.

STEM Fields

Math anxiety can discourage individuals from pursuing or advancing in careers in science, technology, engineering, and mathematics (STEM). Fear of math often prevents adults from entering these fields or advancing within them, even when they are interested.

Reluctance to Take or Upgrade Math Courses

Adults who experience math anxiety are less likely to enroll in math courses, even if they are required for career progression or personal goals. This reluctance to take or upgrade math courses can prevent individuals from pursuing higher education, certification, or career advancement opportunities that require math.

Teacher Math Anxiety

Math anxiety is real, and it can impact teachers just as much as it does students. Recognizing the anxiety and taking steps to address it is key. Here are some tips to help you manage your math anxiety and, in turn, better support your students.

1. Seek Professional Development

Look for professional development opportunities that focus on math instruction. These can help you build a deeper understanding of math and develop new strategies for teaching it effectively.

2. Collaborate with Colleagues

Reach out to colleagues who are comfortable with math. They can help explain concepts you find challenging and share strategies that work in their classrooms.

3. Tackle Math Tasks Directly

Avoiding math tasks only increases anxiety. Start with smaller, manageable tasks and work through them. Completing a task successfully, even a small one, will help you build confidence.

4. Reflect on Your Math Journey

Understand that everyone's relationship with math is different. Reflect on your past experiences to help reframe negative feelings and develop a more positive attitude.

5. Be Patient with Yourself

Overcoming math anxiety takes time. Set small goals and celebrate your progress. Remember, math is a skill that can be developed, and no one is born knowing everything.

Have you ever said this to yourself or a student?

"I'm just not a math person."

"Math has always been difficult for me."

"I'm not good at math, so how can I teach it?"

Supporting Students when the Teacher has Math Anxiety

Encourage Collaboration:

Collaboration is a powerful tool for reducing math anxiety, both for you and your students. Foster a classroom culture where students can work together on math tasks. Encourage group discussions, peer teaching, and problem-solving. Collaborative learning helps students feel supported and reduces the fear of making mistakes.

Foster Open Discussions About Anxiety:

Create an environment where students feel safe discussing their anxieties and frustrations around math. Openly acknowledging that math anxiety exists and that it's okay to feel challenged can relieve some of the pressure students may feel. Sharing your own experiences with math anxiety can also help normalize those feelings and make students feel less isolated.

Supportive and Approachable Teaching:

Be mindful of how you present yourself in the classroom. A supportive and approachable demeanor can go a long way in easing student anxiety. When students see you as someone who is understanding and willing to help, they'll be more likely to seek help when needed and feel less afraid of making mistakes.

Focus on the Process, Not Just the Product:

Shift the focus from getting the "right answer" to understanding the process. Emphasize the importance of reasoning, problem-solving, and critical thinking. Encouraging students to share their thinking, even when they don't have a correct answer, can help alleviate the pressure of perfection and reduce fear of being wrong.

Supporting Students when the Teacher has Math Anxiety

Be Mindful of Your Language:

The way you talk about math matters. Use language that is positive, inclusive, and supportive. Avoid phrases like “this is hard” or “only some people are good at math” which may reinforce negative feelings. Instead, focus on phrases like “let’s explore this together” or “mistakes are part of learning.” How you speak can shape students’ attitudes toward math and influence how they perceive their own abilities.

Normalize Mistakes as Part of Learning:

When students make mistakes, take the opportunity to show that mistakes are part of the learning process. Encourage a mindset where errors are seen as valuable learning moments, not something to be embarrassed about. The more comfortable students feel with making and correcting mistakes, the less anxiety they will associate with math tasks.

Additional Tips for Teachers

Start Small: If the thought of teaching a full math lesson seems overwhelming, break it down into smaller, manageable tasks. Teach one concept at a time and give yourself time to process and reflect on each one.

Practice Self-Care: Like any other form of anxiety, math anxiety can be managed through relaxation and stress-relief techniques. Take breaks when needed, practice deep breathing, or engage in activities that help you relax and reset.

Model Lifelong Learning: Show your students that learning math is a journey, not a destination. By modeling a positive attitude toward learning, even when it’s challenging, you demonstrate resilience and growth. Your willingness to continue learning can be a powerful message for your students.

Strategies that DON'T WORK

Strategies that were found to be detrimental to student success in math, especially when dealing with math anxiety

Timed Assessment

Timed math tasks, such as drills or quizzes, can create pressure and anxiety for students who already struggle with math. The fear of being “caught” or failing under time constraints can discourage students from attempting to complete tasks and lead to feelings of incompetence.

Focus on Memorizing

When math instruction is centered around memorizing facts, formulas, or algorithms, students may feel overwhelmed by the sheer amount of information they need to recall. When students feel anxious, they are more likely to forget or struggle with recalling memorized facts or formulas.

Correct Answers Only

Focusing solely on getting the “correct” answer and ignoring the process or reasoning behind it can make math feel like a series of right-or-wrong questions. This approach can discourage students who struggle with math, as they may feel that they are incapable of reaching the “right” solution.

High Stakes Testing

Frequent high-stakes assessments, where students' grades heavily depend on their math performance, can create an atmosphere of fear and pressure. Students may become so focused on the outcome that they neglect the learning process, increasing anxiety.

Strategies that Work

Some strategies that may help teachers alleviate anxiety in students

Positive Attitude towards Numeracy Tasks

Teacher perspective and attitude can affect how students perceive certain tasks and activities. Teacher is pumped? So are they!

Celebrating Mistakes and Struggle

Just like we celebrate achievement, we need to celebrate mistakes and struggle in order to help students see that correct answers are not the only goal. Critical thinking and problem solving are.

Restructure Assessment Practices

What do our current assessment practices focus on? How can we reduce test anxiety and the pressure of high-stakes assessment?

Make Math Fun

Math is often seen as the subject no one likes. What if Math was the “fun” class that students looked forward to?

Positive Attitude towards Numeracy Tasks

A positive perspective on math can create a supportive environment where students feel empowered to thrive. When teachers maintain a growth mindset and convey the belief that everyone can succeed in math, it helps reduce anxiety and encourages resilience. The way teachers frame math matters, using positive, inclusive wording that emphasizes challenges as opportunities for growth can inspire students to engage rather than retreat. By making math exciting and challenging, teachers can foster a sense of curiosity and accomplishment, reinforcing the idea that "we are all math people" and everyone has the potential to succeed in the subject. This approach creates a classroom culture where students feel supported, motivated, and ready to take on mathematical challenges with confidence.



(Gemini, Google, 2025)

Celebrating Mistakes and Struggle

(Gemini, Google, 2025)

Celebrating errors and mistakes is a crucial step in lessening math anxiety and creating a more supportive learning environment. By acknowledging and supporting students during struggles, teachers can normalize the learning process and help students see that mistakes are a natural part of growth.

Highlighting errors allows teachers to show that everyone makes mistakes and that these moments are valuable learning opportunities, not setbacks. When teachers explain misconceptions in a way that makes students feel understood, it helps them realize they're not alone in their confusion. Emphasizing that success in math is not a one-size-fits-all experience encourages students to focus on the process rather than just the correct answer, reinforcing that the steps taken toward solving a problem are just as important as the final solution. This approach fosters a mindset where mistakes are seen as an essential part of learning, reducing the fear of failure and building confidence.



Restructure Assessment Practices

Changing the way we assess math is key to fostering a more supportive learning environment.

- Removing time constraints and giving extra time allows students to focus on understanding, not rushing.
- Blueprinting exams with varying depth of knowledge questions ensures assessments reflect a full range of abilities.
- Providing formulas or memorized information helps students focus on problem-solving rather than recall.
- Offering multiple methods to solve problems gives students flexibility, without expecting mastery of every approach.
- Focusing on growth throughout the year values progress, so students who improve can still be recognized for their accomplishments.
- Rethinking quizzes and tests as the main form of assessment opens the door to creative alternatives, like group tasks, projects, and games, allowing students to demonstrate their understanding in diverse ways.

This approach to assessment prioritizes growth and understanding over rigid standards.



(Gemini, Google, 2025)

Make Math Fun

Incorporating games and fun tasks into math instruction is essential for reducing student anxiety and creating meaningful opportunities for engagement with numeracy. When students interact with math through hands-on, enjoyable activities, they're more likely to approach it with curiosity rather than fear. Finding numeracy games and tasks that are genuinely engaging can help shift the focus away from rote worksheets and textbooks, allowing students to build skills in a low-pressure environment. Simple tools like board games and card games not only make math feel more accessible but also help reinforce important numeracy concepts. Additionally, using puzzles and riddles encourages critical thinking and problem-solving, helping students develop confidence while having fun.

The following three pages include links to various games, puzzles, and classroom activities that could all be used to make learning math fun!

(Gemini, Google, 2025)



Low-Floor High-Ceiling Tasks

What is it?

A low-floor, high-ceiling task is a type of activity that is accessible to all students (low-floor) but also provides opportunities for deep exploration and challenge (high-ceiling). These tasks are designed so that every student, regardless of their skill level, can engage with the task at a basic level, while also providing pathways for more advanced students to stretch their thinking further.

Example Tasks:

121	16
9	73

How does it help students with Math Anxiety?

Accessible tasks give all students the ability to begin

Encouraging risk-taking in a no-pressure task

Focus on mathematical reasoning rather than computations

More than one possible answer means there are less wrong answers

Where to find some resources:

[Which One Doesn't Belong](#)

[Open Middle Questions](#)

[Same but Different](#)

MULTIPLYING AND DIVIDING RATIONAL NUMBERS 2

Directions: Using the integers -9 to 9 at most one time each, fill in the boxes to create a quotient with the greatest possible value.

$$\frac{\boxed{}}{\boxed{}} \div \frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$$

Numeracy Puzzles & Games

Using games that don't feel like math, but focus on numeracy skills, will help give every student an opportunity to feel successful in math class

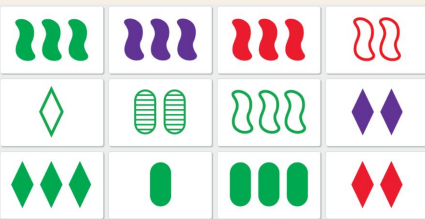


Black Hole

Online/Paper Competitive Game (2 people)

Strategy and problem solving

Ben Orlin's Math Games with Bad Drawings

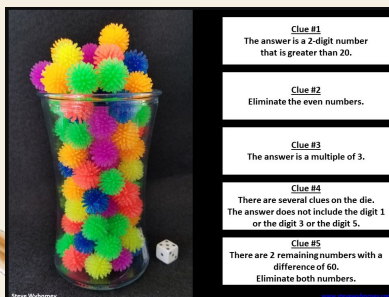


Set Game

Online/Card Game/Activity

Spatial recognition, patterns, and logical reasoning

Play Monster

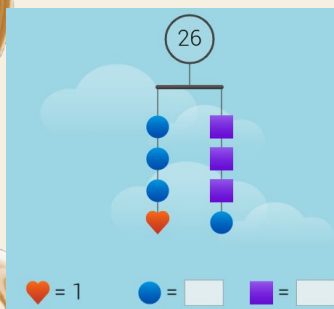


Esti-Mysteries

Online Whole Class Activity

Estimation, number sense, and mathematical reasoning

Steve Wyborney



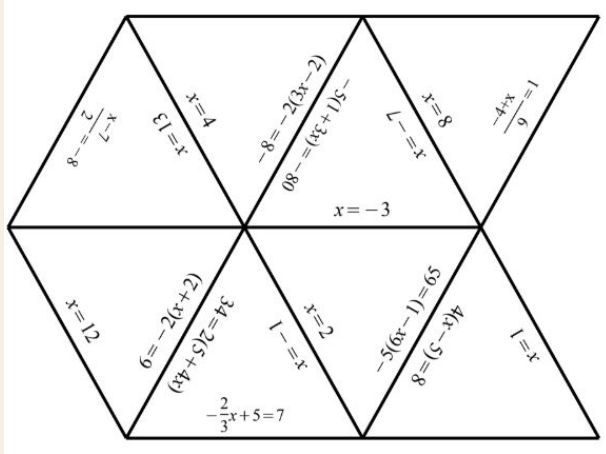
SolveMe Mobiles

Online Activity - Whole Class or Individual Work

Algebraic thinking and problem solving

EDC.org

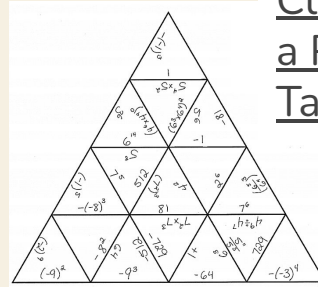
Create Your Own... Adventure?



Do you like doing physical puzzles? Have you tried a **Tarsia Puzzle**? Students cut out each piece and try to match up corresponding sides with equivalent expressions/equations.

Check out this link to create your own:

<https://www.tarsiamaker.co.uk/>



[Click here to see a Power Law Tarsia Puzzle](#)

While the NYT (2024) is engaging readers with daily *Connections* puzzles, why not hop on the bandwagon and create your own for your classroom?

Check out this **Connections Game Generator** (not affiliated with the NYT):

<https://connections.swellgarfo.com/>

Angles & Triangles

by Alberta Teacher

Share Puzzle

TYPES OF TRIANGLES

EQUILATERAL, ISOSCELES, RIGHT, SCALENE

ACUTE ANGLES

12°, 30°, 45°, 60°

REFLEX ANGLES

185°, 225°, 270°, 340°

OBTUSE ANGLES

105°, 135°, 174°, 90°

Click the links below to sample some *Math Connections Games*:

- [Numbers](#)
- [Measurement](#)
- [Fractions, Decimals, Percentages](#)
- [Pre-Calculus Vocabulary](#)

Professional Development Resources

Looking for some person professional development to help you build confidence in teaching math? Check out some of these resources below!

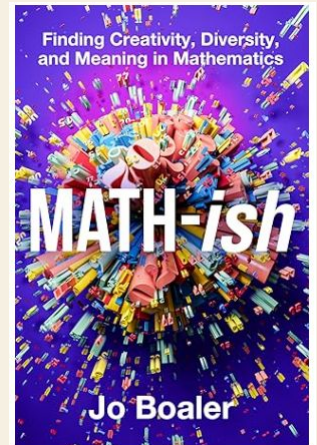
Books

Math-ish

Finding Creativity, Diversity, and Meaning in Mathematics

Jo Boaler (2024)

HarperOne, an imprint of HarperCollins Publishers.

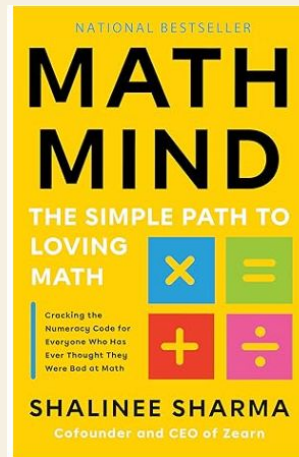


Math Mind

The Simple Path to Loving Math

Shalinee Sharma (2024)

Avery, an imprint of Penguin Random House.

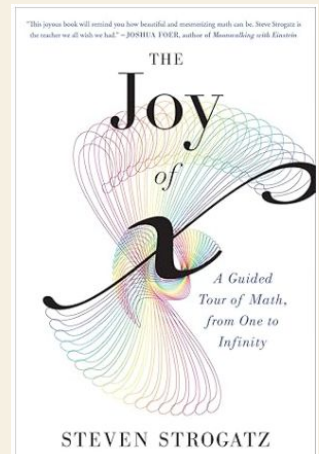


The Joy of X

A Guided Tour of Math, from One to Infinity

Steven Strogatz (2013)

Mariner Books.

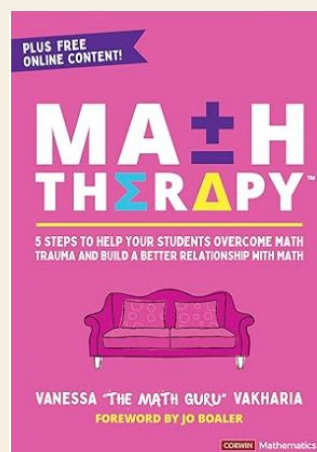


Math Therapy

5 Steps to Help Your Students Overcome Math Trauma and Build a Better Relationship with Math

Vanessa Vakharia (2025)

Corwin, a Sage Company.



Online Courses

Mathematical Mindsets - Stanford University

<https://online.stanford.edu/courses/xeduc215n-mathematical-mindsets>

Math is Figure-Out-Able - Pam Harris Workshops

<https://www.mathisfigureoutable.com/workshops>

References (Cited Works)

Atoyebi, O. M., & Atoyebi, S. B. (2022). The Link between Mathematics Teaching Strategies and Students' Anxiety. *Asian Journal of Education and Social Studies*, 48–57.

<https://doi.org/10.9734/ajess/2022/v33i4716>

Beilock, S. L., & Willingham, D. T. (2014). Math Anxiety: Can Teachers Help Students Reduce It? Ask the Cognitive Scientist. *American Educator*, 38(2), 28.

Doz, D., & Doz, E. (2022). The Impact of COVID-19 Distance Learning on Students' Math Anxiety: An Exploratory Study. *International Journal of Education in Mathematics, Science and Technology*, 11(1), 1–16. <https://doi.org/10.46328/ijemst.2219>

Finlayson, M. (2014). Addressing math anxiety in the classroom. *Improving Schools*, 17(1), 99–115. <https://doi.org/10.1177/1365480214521457>

Geist, E. A. (2010). The Anti-Anxiety Curriculum: Combating Math Anxiety in the Classroom. *Journal of Instructional Psychology*, 37(1), 24–31.

Jackson, C. D., & Leffingwell, R. J. (1999). The Role of Instructors in Creating Math Anxiety in Students from Kindergarten through College. *Mathematics Teacher: Learning and Teaching PK–12*, 92(7), 583–586.

Letwinsky, K. M., & Cavender, M. (2018). Shifting Preservice Teachers Beliefs and Understandings to Support Pedagogical Change in Mathematics. *International Journal of Research in Education and Science*, 106–120. <https://doi.org/10.21890/ijres.382939>

Ruff, S. E., & Boes, S. R. (2014). The Sum of All Fears: The Effects of Math Anxiety on Math Achievement in Fifth Grade Students and the Implications for School Counselors. *Georgia School Counselors Association Journal*, 21(1). <https://eric.ed.gov/?id=EJ1084441>

Shields, D. J. (2007). Taking Math Anxiety out of Math Instruction. *NADE Digest*, 3(1), 55–64.

References (Further Research)

- Beilock, S. L., Gunderson, E. A., Ramirez, G., & Levine, S. C. (2010). Female teachers' math anxiety affects girls' math achievement. *Proceedings of the National Academy of Sciences of the United States of America*, 107(5), 1860–1863. <https://doi.org/10.1073/pnas.0910967107>
- Brewster, B. J., & Miller, T. (2024). Women's mathematics anxiety: A mixed methods case study. *International Journal of Lifelong Education*, 43(1), 8–23. <https://doi.org/10.1080/02601370.2023.2271670>
- Buckley, S., & Sullivan, P. (2023). Reframing anxiety and uncertainty in the mathematics classroom. *Mathematics Education Research Journal*, 35(S1), 157–170. <https://doi.org/10.1007/s13394-021-00393-8>
- Cardone, T., & MTBoS. (2015). *Nix the Tricks: A Guide to Avoiding Shortcuts That Cut Out Math Concept Development* (2nd ed.). Creative Commons License. <https://www.nixthetricks.com/NixTheTricks21.pdf>
- Dowker, I. C., Mammarella, S., & Caviola, A. (2019). *Mathematics Anxiety: What Is Known, and What is Still Missing*. Routledge. <https://doi.org/10.4324/9780429199981>
- Goetz, T., Bieg, M., Lüdtke, O., Pekrun, R., & Hall, N. C. (2013). Do Girls Really Experience More Anxiety in Mathematics. *Psychological Science*, 24(10), 2079–2087. <https://doi.org/10.1177/0956797613486989>
- Gorman, V., Gabriel, F., & Leonard, S. (2023). Explicit metacognitive questioning: A strategy to reduce mathematics anxiety. *Australian Mathematics Education Journal (AMEJ)*, 5(2), 24. Science Reference Source.
- Hembree, R. (1990). The Nature, Effects, and Relief of Mathematics Anxiety. *Journal for Research in Mathematics Education*, 21(1), 33–46. <https://doi.org/10.2307/749455>
- Hill, F., Mammarella, I. C., Devine, A., Caviola, S., Passolunghi, M. C., & Szűcs, D. (2016). Maths anxiety in primary and secondary school students: Gender differences, developmental changes and anxiety specificity. *Learning and Individual Differences*, 48, 45–53. <https://doi.org/10.1016/j.lindif.2016.02.006>

References (Further Research)

Klee, H. L., Buehl, M. M., & Miller, A. D. (2022). Strategies for alleviating students' math anxiety:

Control-value theory in practice. *Theory Into Practice*, 61(1), 49–61.

<https://doi.org/10.1080/00405841.2021.1932157>

Lange, T., & Meaney, T. (2011). I actually started to scream: Emotional and mathematical trauma from doing school mathematics homework. *Educational Studies in Mathematics*, 77(1), 35–51.

Letwinsky, K. M., & Cavender, M. (2018). Shifting Preservice Teachers Beliefs and Understandings to Support Pedagogical Change in Mathematics. *International Journal of Research in Education and Science*, 106–120. <https://doi.org/10.21890/ijres.382939>

Liljedahl, P., Zager, T. J., & Wheeler, L. (2021). Building thinking classrooms in mathematics: 14 teaching practices for enhancing learning: Grades K-12. Corwin.

Ma, X., & Xu, J. (2004). The causal ordering of mathematics anxiety and mathematics achievement: A longitudinal panel analysis. *Journal of Adolescence*, 27(2), 165–179.

<https://doi.org/10.1016/j.adolescence.2003.11.003>

Maloney, E. A., Ramirez, G., Gunderson, E. A., Levine, S. C., & Beilock, S. L. (2015). Intergenerational Effects of Parents' Math Anxiety on Children's Math Achievement and Anxiety. *Psychological Science*, 26(9), 1480–1488. <https://doi.org/10.1177/0956797615592630>

Mehmet, C., & Hulya, S. (2021). Factors that cause students to develop math anxiety and strategies to diminish. *Cypriot Journal of Educational Sciences*, 16(4), 1356–1367.

<https://doi.org/10.18844/cjes.v16i4.5984>

OECD. (2023). PISA 2022 Results (Volume I): The State of Learning and Equity in Education. OECD.

<https://doi.org/10.1787/53f23881-en>

Olson, A. M., & Stoehr, K. J. (2019). From numbers to narratives: Preservice teachers experiences' with mathematics anxiety and mathematics teaching anxiety. *School Science and Mathematics*, 119(2),

72–82. <https://doi.org/10.1111/ssm.12320>

References (Further Research)

- Polydoros, G. (2024). Math Anxiety in the Virtual Classroom during COVID-19 Pandemic and Its Relationship to Academic Achievement. *Mathematics Teaching Research Journal*, 16(4), 213–242.
- Richardson, F. C., & Suinn, R. M. (1972). The Mathematics Anxiety Rating Scale: Psychometric data. *Journal of Counseling Psychology*, 19(6), 551–554. <https://doi.org/10.1037/h0033456>
- Stuart, V. B. (2000). Math Curse or Math Anxiety. *Teaching Children Mathematics*, 6(5), 330–335.
- Vukovic, R. K., Kieffer, M. J., Bailey, S., & Harari, R. R. (2013). Mathematics anxiety in young children: Concurrent and longitudinal associations with mathematical performance. *Contemporary Educational Psychology*, 38(1), 1–10. <https://doi.org/10.1016/j.cedpsych.2012.09.001>

Professional Development Books:

- Boaler, J. (2024). *Math-ish: Finding creativity, diversity, and meaning in mathematics* (First edition). HarperOne, an imprint of HarperCollinsPublishers.
- Orlin, B. (2022). *Math games with bad drawings: 75 1/4 simple, challenging, go-anywhere games - and why they matter* (First edition). Black Dog & Leventhal Publishers.
- Sharma, S. (2024). *Math mind: The simple path to loving math*. Avery, an imprint of Penguin Random House.
- Strogatz, S. (2013). *The joy of X: A guided tour of math, from one to infinity* (1. ed). Mariner Books.
- Su, F. E. (with Jackson, C.). (2020). *Mathematics for human flourishing*. Yale University Press.
- Vakharia, V. (2025). *Math therapy: 5 steps to help your students overcome math trauma and build a better relationship with math*. Corwin, a Sage Company.