# Maths Anxiety and Mathematical Empowerment

*A summary for class discussion, based on Lorna Brown's research and student booklet*

## 1. What is maths anxiety?

Maths anxiety is a feeling of stress or worry that gets in the way of how well someone can do maths — it is not a reflection of ability. Anyone, at any level of maths, at any age from around six years old into adulthood, can experience it. Left unaddressed it tends to continue; addressed directly, it can be reduced.

- It is an emotional (affective) response, not a measure of maths ability — anxiety and ability are separate things.
- Research (Ashcraft & Moore, 2009) shows anxiety causes a real, measurable drop in performance, even in people who are otherwise capable.
- It can start young and, without support, can follow someone into adulthood.
- It can be passed on: research shows maths-anxious teachers and parents can transfer their own anxiety to children (Beilock et al., 2010; Maloney & Beilock, 2012), which is why talking about it openly with a class matters.

## 2. What happens in the brain

When someone experiences maths anxiety, the reaction is biological and largely subconscious — it is the brain's fear response, not a conscious choice to "give up".

- The amygdala detects a threat and triggers the body's fear response.
- The hippocampus, tied up in that heightened emotional state, reinforces the negative feeling rather than helping form clear new memories.
- The prefrontal cortex — responsible for working memory, attention and number reasoning — loses activity.
- The result: number reasoning, working memory and attention all drop at once. The thinking brain goes "offline" and the person genuinely cannot access skills they otherwise have.

> *Key message for students: this is not a lack of ability — it's a temporary biological state. Once we understand it, we can work with it.*

## 3. The Learning Zone

A simple model for talking about comfort and challenge with students:

- Comfort zone — where a task feels easy and safe, but there's little new learning.
- Learning zone — where a task is a stretch, mistakes happen, and real progress is made. This is where we want students working.
- Offline / red zone — where the challenge is so overwhelming that the thinking brain shuts down and no learning can happen.

This gives students and teachers shared language for checking in: "which zone are you in right now?" is a quick, low-stakes way to notice rising anxiety before it tips into shutdown.


Lorna Brown 2026

## 4. Growth mindset vs fixed mindset

- Growth mindset: the belief that you can make progress in maths with effort, strategy and support ("I'm not sure how to do it, but I'll give it a go").
- Fixed mindset: the belief that maths ability is fixed regardless of effort ("I'm just not a maths person").

Language matters here — from parents, friends, teachers, and social media. Part of the classroom discussion is helping students notice where their own self-talk about maths comes from, and that it can be changed.

## 5. Recognising the response: fight, flight or freeze

Maths anxiety shows up differently in different students, and often differently at home versus at school. Common patterns:

- Fight / aggression — arguing, verbal or physical outbursts, banging the table.
- Flight / avoidance — leaving the room, "losing" homework, procrastination, distraction.
- Freeze / shutting down — staring at the page, doing nothing, not asking for help.

None of these are defiance for its own sake — they are stress responses. Naming them helps students (and teachers) recognise the pattern in the moment rather than reacting to the behaviour alone.

## 6. Building mathematical resilience: skilled questioning

Rather than giving answers, the research-backed coaching approach is to ask open questions that keep the student doing the thinking — building independence and resilience rather than dependence.

- What is the question asking you? What are the key words?
- What have you done so far? What else might you try?
- Can you represent this visually, with objects, or in a different way?
- Where exactly are you stuck? What do you need to know to go further?

The listener's job is to hold back and let the student persist — jumping in too early removes the chance to build resilience.

## 7. Why this matters — the evidence base

This material is grounded in Lorna Brown's practitioner research (2018) into maths anxiety workshops delivered to parents and teaching staff. Feedback from both groups was strongly positive, with teachers in particular reporting sustained changes in how they talk about and respond to maths anxiety in the classroom. The research also found that ideas fade without reinforcement — which is exactly why revisiting this material with students, in worksheets and short discussions, matters more than a single one-off lesson.

## 8. How to use this in class

- Start with the "What is maths anxiety?" worksheet as a whole-class discussion opener — normalise the topic before anything else.

- Use the brain-science and Learning Zone worksheets/infographics to build shared vocabulary students can use to self-report ("I'm in the red zone").
- Use the fight/flight/freeze and thoughts-and-emotions worksheets for individual reflection, followed by optional pair/small-group sharing.
- Use the growth vs fixed mindset sort as a quick, repeatable warm-up at the start of any maths unit.
- Use the skilled-questioning cue cards for paired role play, so students practise supporting each other rather than just receiving support from the teacher.
- Display the infographic posters in the classroom as ongoing visual reminders, not just for a single lesson.

## References

Ashcraft, M. H., & Moore, A. M. (2009). Mathematics anxiety and the affective drop in performance. Journal of Psychoeducational Assessment, 27(3), 197–205.

Beilock, S. L., Gunderson, E. A., Ramirez, G., & Levine, S. C. (2010). Female teachers' math anxiety affects girls' math achievement. PNAS, 107(5), 1860–1863.

Maloney, E. A., & Beilock, S. L. (2012). Math anxiety: Who has it, why it develops, and how to guard against it. Trends in Cognitive Sciences, 16(8), 404–406.

Lee, C., & Johnston-Wilder, S. (2016). The construct Mathematical Resilience. In Understanding Emotions in Mathematical Thinking and Learning. Elsevier Academic Press.

Brown, L. (2018/2019). Maths Anxiety and Mathematical Empowerment; Education Enquiry: Evaluation of efficacy of maths anxiety workshops. Unpublished practitioner research.