



Mindful Learning in the Math Classroom
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What is Mindful Learning?

- Recognizing that school is stressful, and for many students, math in particular is a major stressor
- Explicitly teaching coping mechanisms for academic stressors
 - Lifelong skills for all subjects taught in context of fear of math, which is (sadly) socially acceptable
 - SAT is another “in” for finding receptive students
- A strategy for combating the negative effects of math anxiety in your classroom
 - Remediation → +20 percentile points on standardized tests

Math Anxiety Basics

- State anxiety (vs. trait anxiety) only present when doing math
- Different components of math anxiety:
 - Affective - general fear of or dislike of math
 - Social/performance - board work in front of class, small group work with peers
 - Test anxiety
- Affects learning through blocking working memory (phonological loop)

Ages of Onset

- Three major ages of anxiety onset (Hembree, 1990):



- 93% of American adults self-identify as being bad at or disliking math
- Grades 1-3 are more likely stereotype threat
 - A great opportunity to work on preventative measures

Why Mindfulness?

- We are evolutionarily hardwired to run away from threats – if you don't run away from the lion, you're food!
- We cannot talk ourselves out of it – our prefrontal cortex shuts down so we don't lose running time thinking
- To calm our mind, we calm our bodies. This is mindfulness.
 - Square breath for ten seconds
 - In for 5, out for 7 (better with very young children)
- Once we are calm, we can look behind us and see there is no lion (functioning prefrontal cortex)
 - What do I know about the problem? Nobody knows everything, but everybody knows something.

Three primary principles guide UDL—and provide structure for the Guidelines:

To learn more, click on one of the Guidelines below.

I. Provide Multiple Means of Representation

Perception

Language, expressions, and symbols

Comprehension

II. Provide Multiple Means of Action and Expression

Physical action

Expression and communication

Executive function

III. Provide Multiple Means of Engagement

Recruiting interest

Sustaining effort and persistence

Self-regulation



UDL Guidelines

<http://www.udlcenter.org/aboutudl/udlguidelines>

Mirror Neurons

- Both math anxiety and stereotype threat are largely due to modeled behavior by parents and teachers
 - Mirror neurons and emotional alignment
 - Body posture, eye movements, facial expression
 - Not attributable to math content
- We can also model mindful behavior
 - Be the change that we want to see in our students
 - Build new pathways in the brain
 - Create mindful rituals around classes, test-taking

The Mindful Classroom

- Create mindful rituals around your class
- Activate mirror neurons
 - Shake hands with your students as they enter the room, making eye contact
- Smiling
 - “Fake” smiles can turn into real smiles through natural endorphins
 - Be careful to do this as an exercise, and do not force it
- “Mindful Minute” guided meditation to start class
 - What do they hear? What do they smell? What do they feel in their bodies?

The Mindful Classroom

- “Chair Yoga”
 - Find your spine’s neutral position
 - Neck rolls, shoulder rolls
 - Seated cat/cow
 - Seated twist
 - Interlaced hands reach, wrist rolls
 - Self-massage of forearms, neck, base of skull
- Journaling (we’ll come back to this)
- Mindful Action – the “helper’s high”
 - Giving back to the community, being kind to someone else

Movement Breaks

- Dopamine allows us to focus and maintain attention, and it is depleted over the course of the class.
- For the first 20-30 minutes, they are paying attention and learning. For the next 20-30 minutes, they are focusing on trying to stay still (or getting in trouble for failing). Either way, learning is affected.
- Ritual of movement breaks to boost dopamine levels. Have the class pick a different activity for every day (their choice increases buy-in).
- Start of class, halfway through class (or every 20-30 mins).

Movement Breaks

- Jumping Jacks
- Hang a piece of yarn from the ceiling that's just out of reach. Have them jump to see if they can touch it.
- Stepping onto a block and back down
- Reach up to side on R, touch down to foot on L, repeat opposite side
- Running in place
- What do the students come up with?

Movement and Mindfulness

- Opportunity to focus inward once they're seated
 - Notice heart rate
 - Notice breathing
- Then, focus outward
 - What can you hear?
 - What can you see?
- Now you have a focused child with more dopamine
- The ritual/repetition creates new pathways in the brain, allows for faster transition times

Journaling

- Practice Gratitude – write something every day that makes you grateful
- Record change over time to see change objectively
 - Changes can be in mood or achievement
- Twenty minutes once a semester to write out the values that make you uniquely you
 - Protects against stereotype threat, but only if they don't know what they're doing
- Write about a happy experience

Guided Processing

- Growth mindset language and the power of YET
- Cognitive restructuring around self-evaluation (especially after getting a test back)
 - Say it out loud!
- Recognize emotions and let them pass without judgment
 - Fear, anger, failure, jealousy, competitiveness
- Careful with consoling language – WARN PARENTS
 - Math is hard; I was never good at math either

The Role of Nature

- Time in nature has been shown to quiet the worried part of the brain (subgenual prefrontal cortex)
- Opportunity to spend time feeling and listening mindfully
 - Homework assignment = go outside for 20 mins
 - Journal about what you see, hear, feel, smell
- Beyond math anxiety, goals of mindfulness are becoming aware, slowing down the body, noticing common things in new light, finding joy, achieving goals, creating peace within oneself
 - Protection against all the other stressors we cannot control

Next Steps

- Cristina@[affectacademics.com](mailto:Cristina@affectacademics.com)
 - Affectacademics.com/pd
- Mindful Learning Workshops at your school
 - PD around math anxiety for (ALL) faculty
 - Mindfulness training workshops for students
- Look at the greater context – reducing stress levels at your school
 - Later start times for high school (and general education around healthy sleep habits)
 - More opportunities to exercise
 - Reducing/eliminating known stressors: class rank, timed tests, hunger



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