



Shifting the Mathematical Mindsets of a School

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The Frances Xavier Warde School's Journey

The *what*?

The *why*?

The *how*?

Our Philosophy of Math Education is Rooted in the Below Research

Where do you feel your school/classroom falls in these research-based goals.

1 - This is starting to develop in some classrooms and with some students.

2 - Most teachers agree with this, but some of our practices contradict it.

3 - This aligns to our instructional practices and policies in every classroom and is a value understood and appreciated by teachers, students, and parents.

1) Everyone with the right teaching and messages, can be successful in math , and everyone can learn to high levels in schools. No one is born knowing math, and no one is born lacking the ability to learn math (Boaler, 2016).	1	2	3
2) Students who believe their talents can be developed (through hard work, good strategies, and input from others) have a growth mindset . They tend to achieve more than those with a more fixed mindset (those who believe their talents are innate gifts). Therefore, they put in extra time and effort, and that leads to higher achievement. The growth mindset can be fostered (Dweck, 2006).	1	2	3
3) Mistakes show your brain is hard at work . The brain sparks and shows that information is processing, even if we are not aware of it, because it is a time of struggle; the brain is challenged. Classroom culture and design is "mistakes friendly." (Moser et al., 2011).	1	2	3
4) Active learning process -students learn best when they are active rather than passive learners. Students must be engaged in exploring, thinking, practicing, and using knowledge, rather than listening to verbal concepts. (Sun & Pyzdrowski, 2009; Curtain-Phillips, 2001; Schreiner, n.d.).	1	2	3
5) Mathematical discourse in cooperative groups provide students with opportunities to exchange ideas, ask questions freely, verbalize their thoughts, justify their answers, and debate processes. (Geist, 2010; Hellum-Alexander, 2010; Woodard, 2004; Haralson, 2002; Curtain-Phillips, 2001).	1	2	3
6) The aim of mathematics education is to create autonomous learners who persevere in problem-solving . The purpose of mathematics education is not to impart knowledge, but instead to facilitate a student's thinking and problem-solving skills which can then be transferred to a range of situations (Bruner, 1961).	1	2	3
7) Math instruction should develop symbolic thinking in children, moving from concrete to pictorial to abstract . Concrete, conceptual understanding leads to procedural fluency (Bruner, 1961).	1	2	3
8) Instruction moves beyond instrumental understanding (the ability to execute mathematical rules and procedures) and focuses on relational understanding (knowing both what to do and why) . Students are able to build schema and find new ways of "getting there" without outside help demonstrating great flexibility . (Skemp, 1976).	1	2	3
9) In addition to teaching mathematics for its own sake, we strive to teach mathematics so that students learn to value diversity, see mathematics in their lives, cultural backgrounds, through literature and in nature and analyze and critique social issues and injustices . These learn-see-analyze purposes require connecting mathematics to real-world contexts . (Felton et al., 2012).	1	2	3

Activities to Promote:

Flexibility
Active Learning Process
Persevere in Problem Solving
Growth Mindset
Assessment

Resources:

- **Lesson Study Alliance** www.lsalliance.org/
LessonNote App



- **NCSM-NCTM-Curriculum Materials Analysis Tools**
www.mathedleadership.org/ccss/materials.html
- **Jo Boaler and Stanford University** www.youcubed.com
- *Mathematical Mindsets* by Jo Boaler
- **Number Talk Resources:** *Number Talks: Fractions, Decimals, and Percentages*, by Sherry Parrish and Ann Dominick and *Number Talks: Whole Number Computation* by Sherry Parrish
- **Maths No Problem:** <https://mathsnoproblem.com/> (Mastery tab)
- **Methodology** <https://methodology.com/> (Video & Resources tab)
- **John Hattie's Research on Visible Learning** <https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/>
- **Jo Boaler's Mathematical Mindset Teaching Guide** <https://www.youcubed.org/mathematical-mindset-teaching-guide-teaching-video-and-additional-resources/>

Contact
Us

Jackie Miller millerj@fxw.org
Director of Curriculum and Instruction

Amy Bilek bileka@fxw.org
Math Department Chair