

Fostering a Growth Mindset in Developmental Mathematics

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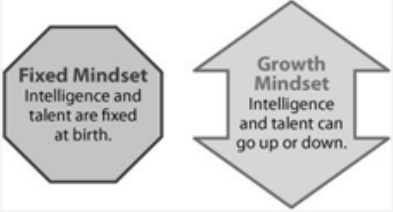
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Introduction to Growth Mindset Video: (bitly links are case sensitive)

Link: <https://bit.ly/GMindIntro>

Mindset Matters

- Mindsets are the beliefs and expectations that people have about their own abilities
- Mindsets play a noticeable role when a student transitions from middle school to high school or high school to college (Dweck, 2006).

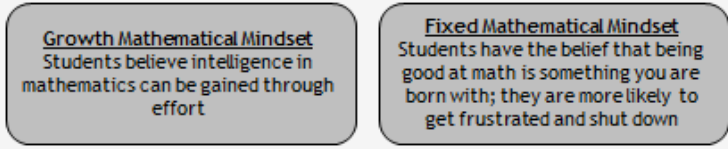


Fixed Mindset
Intelligence and talent are fixed at birth.

Growth Mindset
Intelligence and talent can go up or down.

Growth vs. Fixed Mathematical Mindset

- Boaler (2016) applied Dweck's mindset research to mathematics.

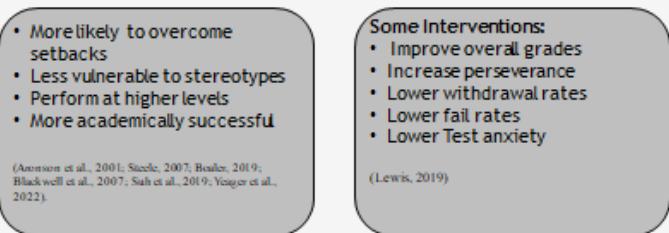


Growth Mathematical Mindset
Students believe intelligence in mathematics can be gained through effort

Fixed Mathematical Mindset
Students have the belief that being good at math is something you are born with; they are more likely to get frustrated and shut down

Why is this important?

- How does having a Growth Mindset benefit students:



Benefits:

- More likely to overcome setbacks
- Less vulnerable to stereotypes
- Perform at higher levels
- More academically successful

(Arneson et al., 2001; Sieckel, 2007; Boaler, 2019; Blackwell et al., 2007; Suh et al., 2019; Yeager et al., 2022)

Some Interventions:

- Improve overall grades
- Increase perseverance
- Lower withdrawal rates
- Lower fail rates
- Lower Test anxiety

(Lewis, 2019)

How can you foster a Growth Mindset?

<https://soeonline.american.edu/blog/growth-mindset-in-the-classroom/>

- Normalize struggle
- Encourage engagement with challenges
- Embrace the word "yet"
- Tout the value of hard tasks to the brain
- Demonstrate mistakes and celebrate corrections
- Set incremental, achievable goals
- Develop cooperative exercises
- Provide challenges
- Avoid praising intelligence
- Don't oversimplify with empty encouragement

Growth Mindset Classroom Activities Weekly Outline

Week 1	<ul style="list-style-type: none">• In class activities that give students the opportunity to appreciate that there are different ways of finding the same answer (or even different answers), learn to work together, and see that mistakes are valued<ul style="list-style-type: none">○ Examples: Which One Doesn't Belong?, Four Four's Activity• Mathematical Mindset Pre-Survey
Week 2	<ul style="list-style-type: none">• Presentation from Academic Support Center staff on time management and test anxiety• Growth Mindset Video 1 with written reflection
Week 3	<ul style="list-style-type: none">• Growth Mindset Video 2 with written reflection
Week 4	<ul style="list-style-type: none">• Growth Mindset Video 3 with written reflection• In class activity: Growth vs. Fixed Mindset Poster or Post-Its<ul style="list-style-type: none">○ Using your students' input, make a two-column poster on the beliefs and behaviors of a growth mindset and how it compares to a fixed mindset. Urge students to map out how beliefs influence behaviors which ultimately lead to results.○ If they need scenarios to help them brainstorm, use the examples below or create your own!<ul style="list-style-type: none">What are the behaviors/thoughts of people that believe intelligence can be developed when:<ul style="list-style-type: none">• ...they fail a test?• ...they put a lot of effort into practicing for a basketball game but still lose?• ...they don't understand a math problem?• ...they are not putting any effort into their class but are passing?○ Use this poster as a reference throughout the semester to help students recognize when they have a fixed mindset and to give them ideas on methods to shift towards a growth mindset
Week 5	<ul style="list-style-type: none">• Growth Mindset Video 4 with written reflection after exam
Week 6	<ul style="list-style-type: none">• Growth Mindset Video 5 with written reflection
Week 14 or 15	<ul style="list-style-type: none">• Mathematical Mindset Post-Survey

MyOpenMath Course Resource Site: <http://www.myopenmath.com>

Course ID: 182606 (No enrollment key needed, leave blank)

Additional Resources:

- <https://www.youcubed.org/>
- Boaler, J. (2016). Mathematical mindsets. Jossey-Bass.
- Boaler, J. (2019). Limitless mind: Learn, lead, and live without barriers. Harper Collins Publishers.
- Dweck, C. (2006). Mindset: The new psychology of success. Random House.

Growth Mindset Class Videos (bitly links are case sensitive)

- Video 1: Everyone can be good at math

Link: <https://bit.ly/GMind1>

Reflection question: After watching the video, write a summary in the text box below about what happens when we learn.

- Video 2: Mistakes

Link: <https://bit.ly/GMind2>

Reflection question: After watching the video, write a summary in the text box below about how making mistakes helps you learn.

- Video 3: Mindset Matters

Link: <https://bit.ly/GMind3>

Reflection question: After watching the video, write a summary in the text box below about how mindset matters.

- Video 4: The Importance of Struggle

Link: <https://bit.ly/GMind4>

Reflection question: After going back through your Exam and watching the video, answer the following questions.

1. What went well on this exam?
2. What surprised you most on this exam?
3. Which question or type of question felt most difficult to you?
4. What did you learn from looking back through your exam?
5. Write a Growth Mindset attitude statement about your math learning.

- Video 5: Boosting Math

Link: <https://bit.ly/GMind5>

Reflection question: After rereading your previous Growth Mindset reflections this semester and watching the video, answer the following.

1. In your life, there are some areas that are under your control and some areas that are not under your control. For example, you can control how much time you spend on your phone each day, but you cannot control when an assignment will be due in class. Give at least three examples of areas in your life that are under your control.
2. In those areas that are under your control, identify one thing that is not going well right now.
3. Write down one step that you can take to create change and improve that situation.
4. Making a plan for managing your time can help you make the most of the time you control. Look at your schedule for the next week (time at work, time in class, time asleep, etc.) and write down a study plan for each of the next five days.

Mathematical Mindset Survey

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1) No matter who you are, you can learn math.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2) I can improve my math skills, but I can't change my basic math ability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3) To be honest, you can't really change how much math talent you have.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4) It's possible to change even your basic level of math intelligence.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5) In math, there will always be some students who just don't "get it" and others that do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6) Math ability is something that remains relatively fixed throughout a person's life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7) Some people just have a knack for math, and some just don't.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8) All students would be good at math if they worked hard at it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9) There isn't much you can do about how much math ability you have.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Score	Mathematical Mindset
37–45	Growth Mindset
28–36	Growth Mindset with some Fixed Ideas
19–27	Neither Fixed nor Growth Mindset
10–18	Fixed Mindset with some Growth Ideas
0–9	Fixed Mindset

Stipek, D. J., Givvin, K. B., Salmon, J. M., & MacGyvers, V. L. (2001). Teachers' beliefs and practices related to mathematics instruction. *Teaching and Teacher Education*, 17(2), 213–226. [https://doi.org/10.1016/S0742-051X\(00\)00052-4](https://doi.org/10.1016/S0742-051X(00)00052-4)