Student-Centered Learning with Project-Based Assessments in the Mathematics Classroom

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Learning Intentions

Participants will:

- Understand the purpose and value of project-based assessments.
- Walk away with at least one idea for future implementation.

Data Talk

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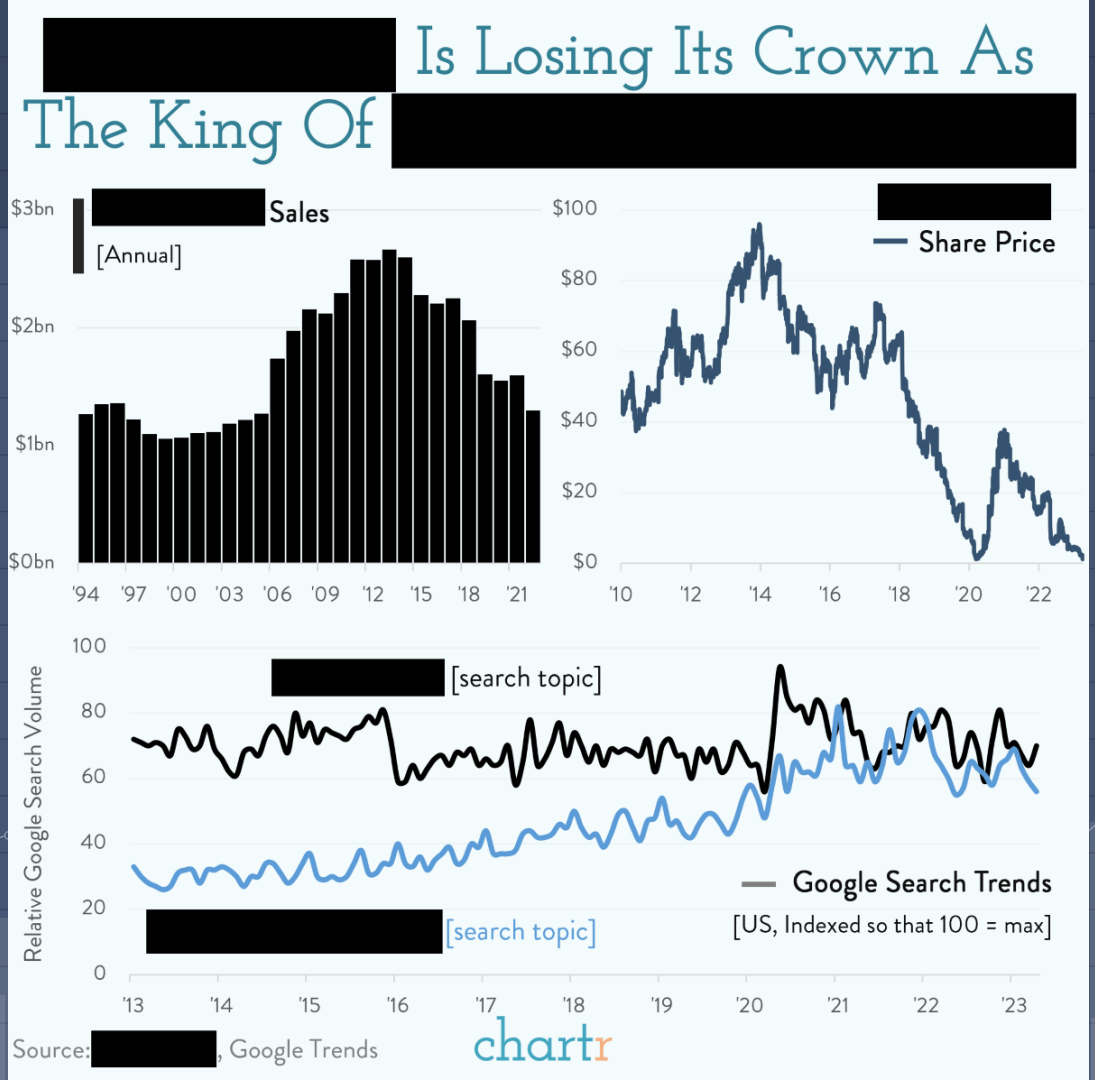

Data Talk

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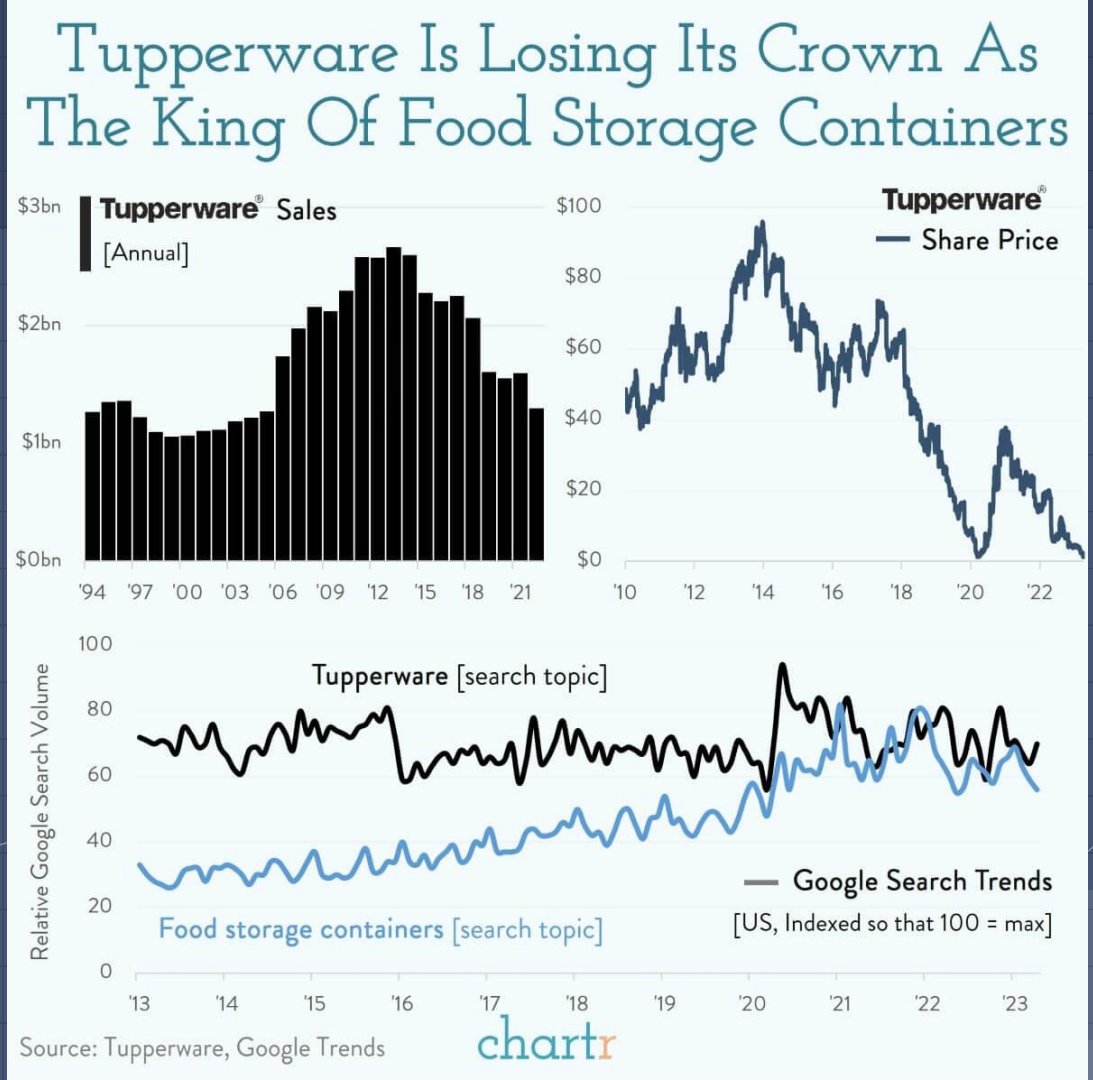


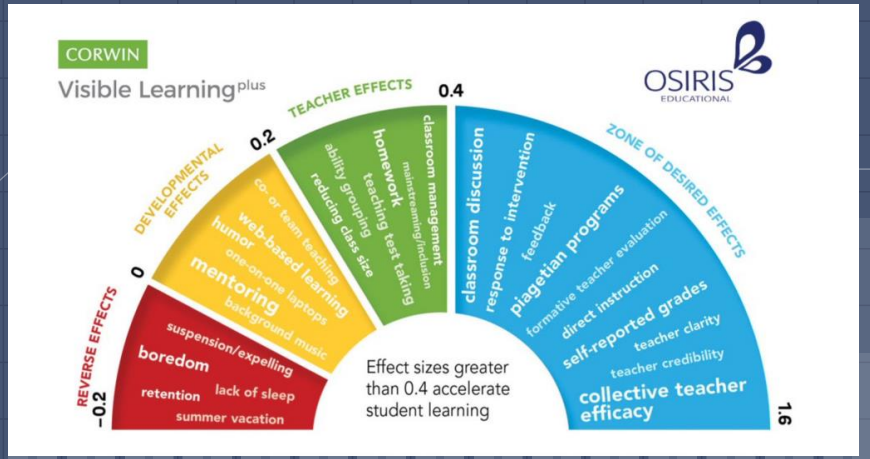
NCTM's 8 Effective Teaching Practices

- Establish math goals to focus learning.
- **Implement tasks that promote reasoning and problem solving.**
- **Use and connect math representations.**
- **Facilitate meaningful math discourse.**
- **Pose purposeful questions.**
- Build procedural fluency from conceptual understanding.
- Support productive struggle in learning math.
- **Elicit and use evidence of student thinking.**

Research

Visible Learning for Mathematics by John Hattie

- High expectation of student – 1.57
- **Cognitive task analysis – 1.29**
- **Student self efficacy – 0.92**
- **Classroom discussion – 0.82**
- Feedback – 0.75
- Metacognitive strategies – 0.60
- Cooperative learning – 0.40



FROM TEACHER-CENTERED TO STUDENT-CENTERED

2017

This isn't working! November – Can we do a project instead of a final exam?

2018 - 2019

Quarterly Comprehensives and Final Exam

2019 - 2020

Unit Project Assessments until…

2021 - current

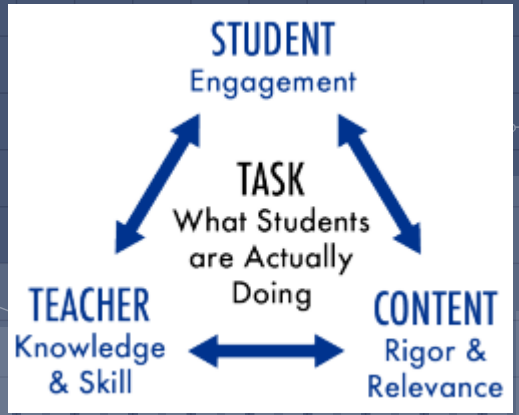
Redesigned course, unit projects, and Final Exam

Problem of Practice

- Algebra, Functions, and Data Analysis (AFDA) was being taught like Algebra 1.5.
- Student performance was low, failure rates were high.
- Results on the state assessment for Algebra 1 were poor.
- Students with disabilities had failure rates above 40%

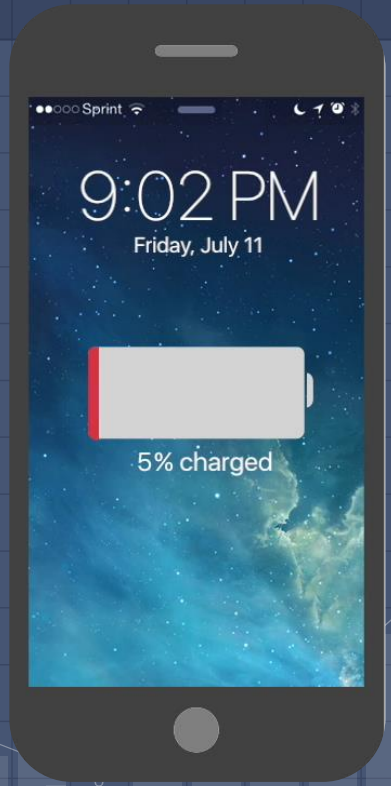
Goal

- Increase students' mathematical agency and identity.
- Decrease math anxiety.
- Improved mathematical reasoning and number sense.



Final Exam Project Year 1

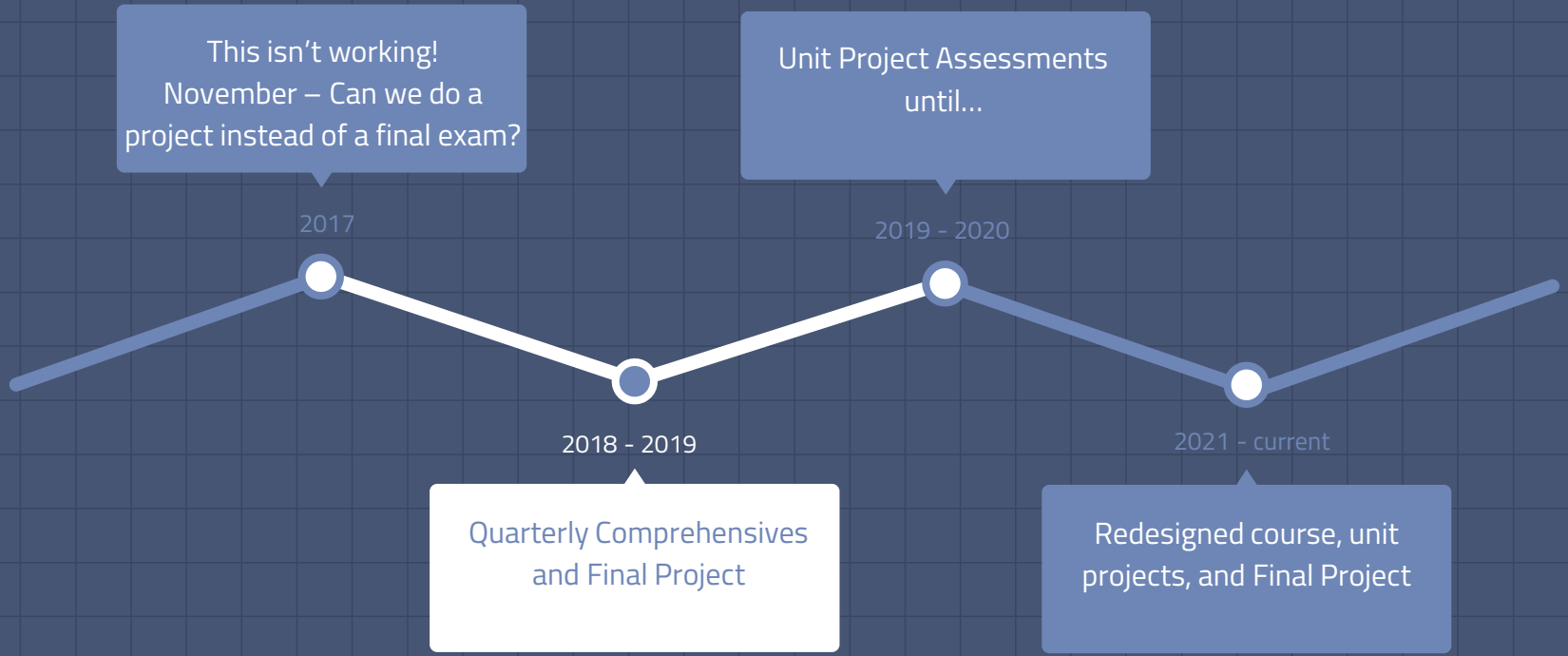
- Time spent preparing
- Time spent implementing
- Reflection



Lessons Learned

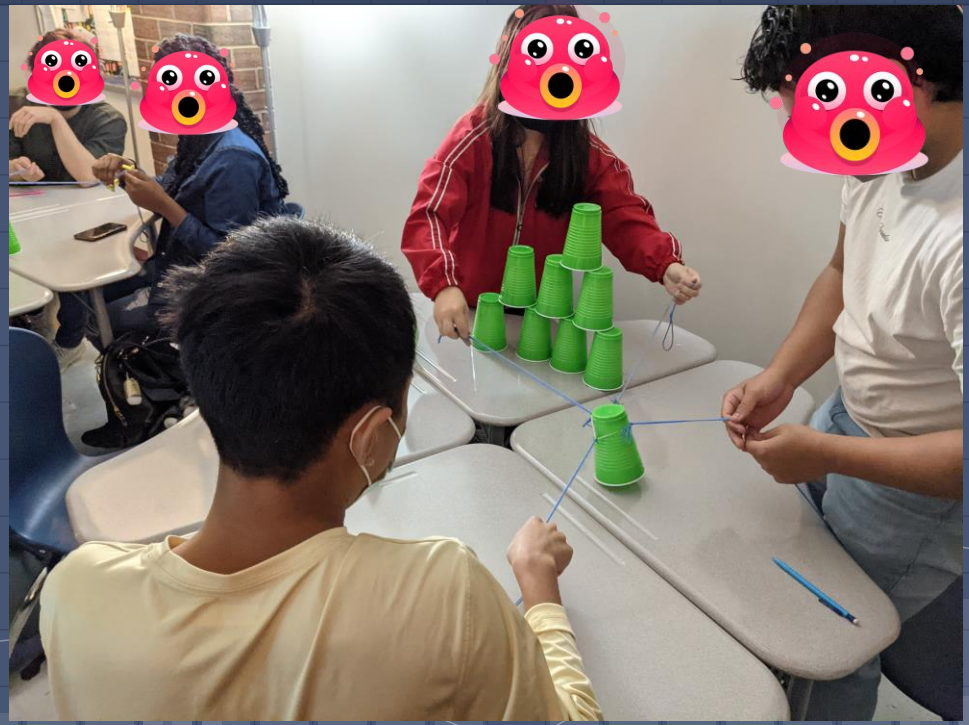
- Students preferred projects over tests.
- We needed to have more detailed rubrics.
- The projects needed more scaffolding, both in the project and in the instruction leading up to the project.
- Our students were brilliant!

FROM TEACHER-CENTERED TO STUDENT-CENTERED



Classroom Culture to Project Based Assessment

- Low floor, high ceiling
- Rubric based grading
- Student perceptions
- Teacher resistance



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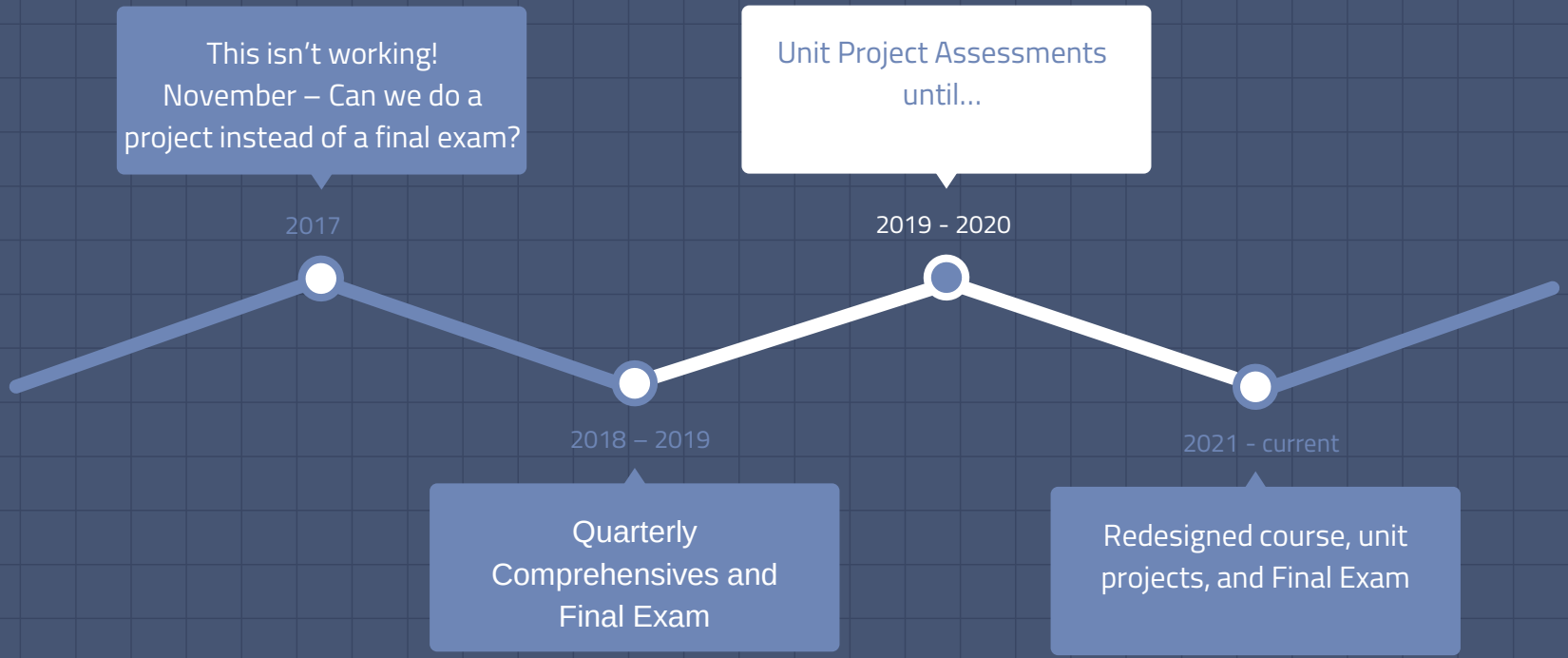
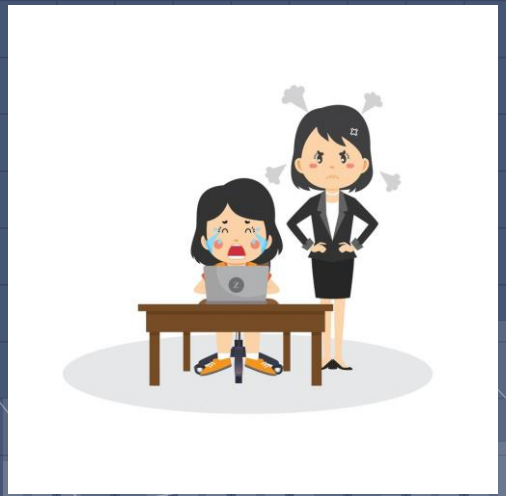


August 2019 – March 2020

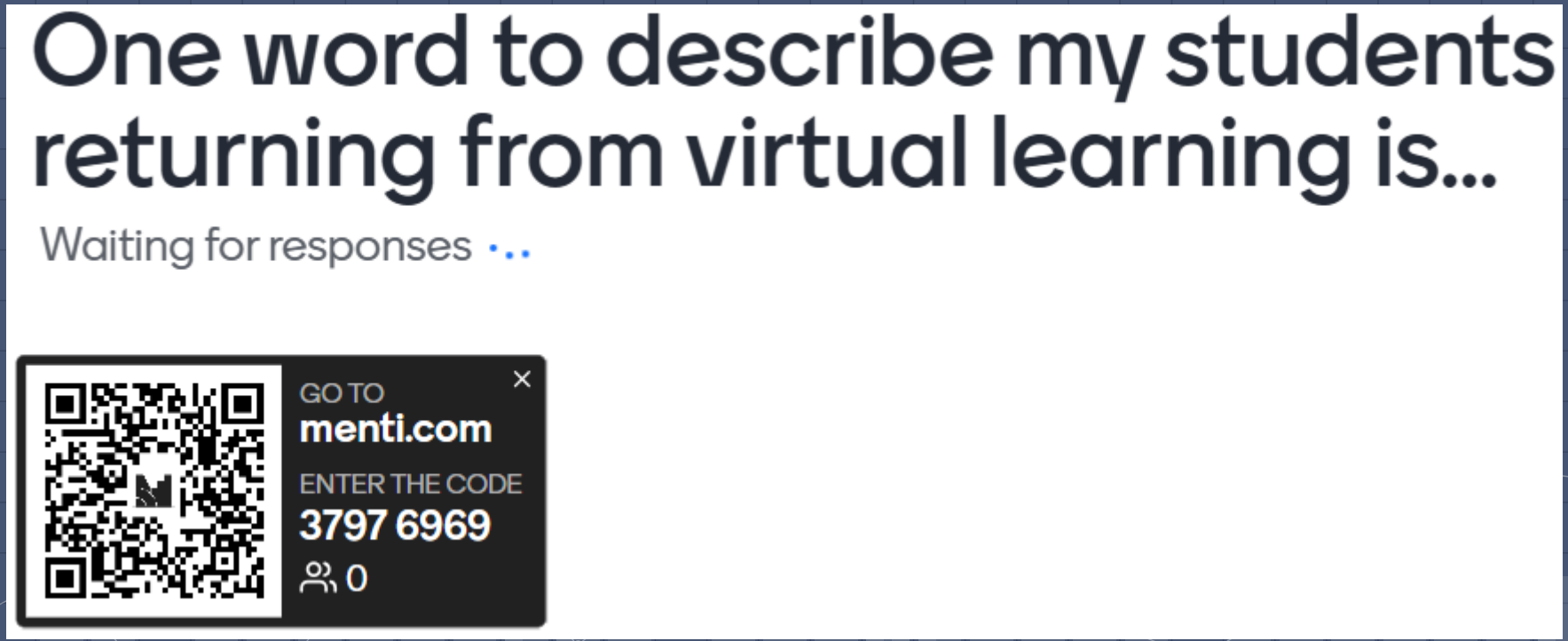
- Created unit projects.
- Students were able to show mastery.
- Everything was going great!
- Then….March 13, 2020 PWCS shut down for the rest of the year.
- **We had already measured out ALL OF THE M&Ms!**

School Year 2020-2021

- We all know how that went.



The Struggle was Real



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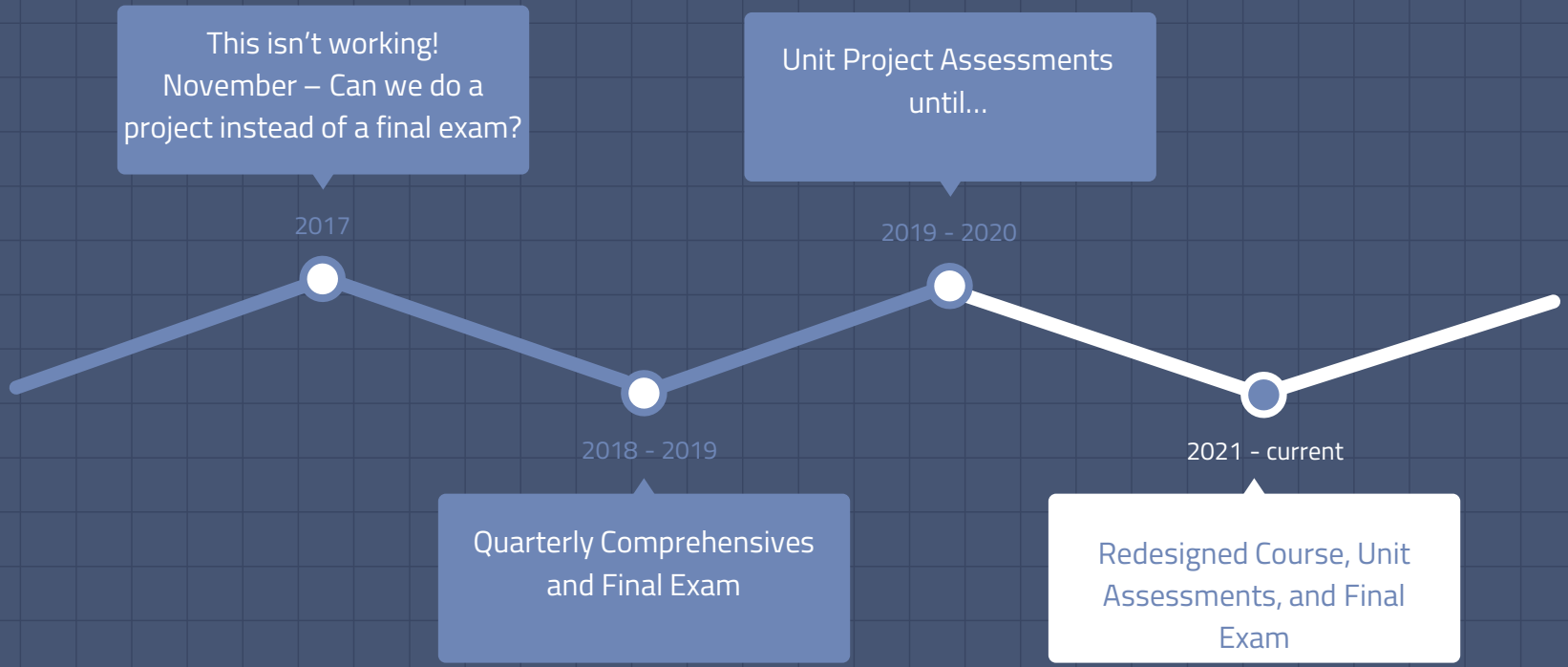
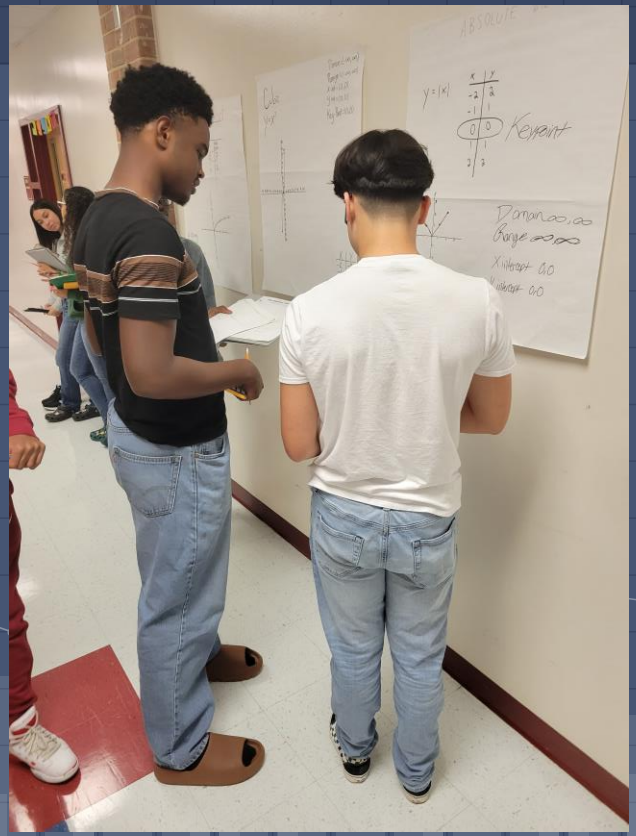


Creating a Classroom Culture to Student Centered Learning

- Universal Design for Learning
- Flipping gradual release
- Low floor, high ceiling
- One-on-one conferences
- Student perceptions



Redesigned Course

▾ M1T2 Graphs of Two Variable Inequalities

M1T2 Lesson: Graphs of Two Variable Inequalities

Pick TWO out of the four assignments to complete

M1T2 Assignment #1 - Worksheet
0 pts

M1T2 Assignment #2 - Spinner Activity w/ worksheet
0 pts

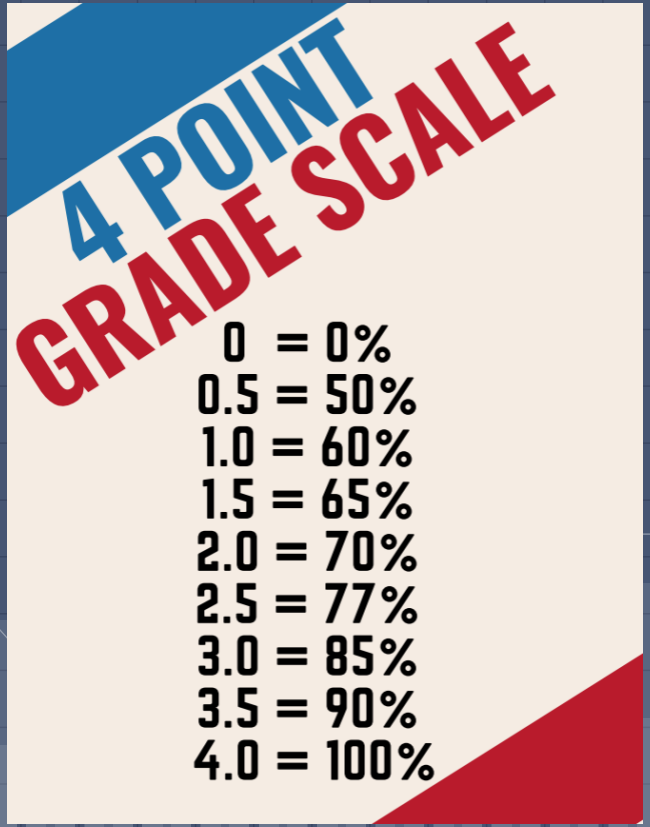
M1T2 Assignment #3 -Desmos Graphing Linear Inequalities Activity
0 pts

M1T2 Assignment #4 - Kahoot! Game Activity
0 pts

M1T2 Quick Check
Sep 5 | 15 pts | Score at least 4.9

Updated Unit Assessments

- Grading normed through rubrics by learning targets
- Mastery based grading
- Multiple versions allow student choice and multiple chances to show mastery.
- Targeted remediation.



Student feedback

"I liked that it was self-paced because it helped me understand the information better and I was able to go over stuff more if I didn't understand." – AM (class of 2024, student 2021-22)

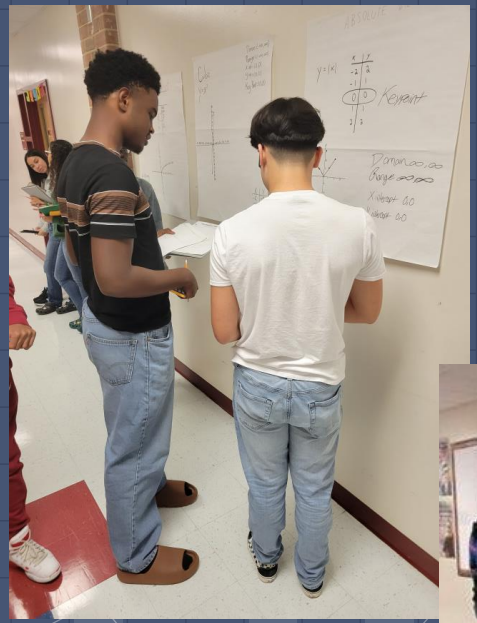
Supporting our ELS and SPED

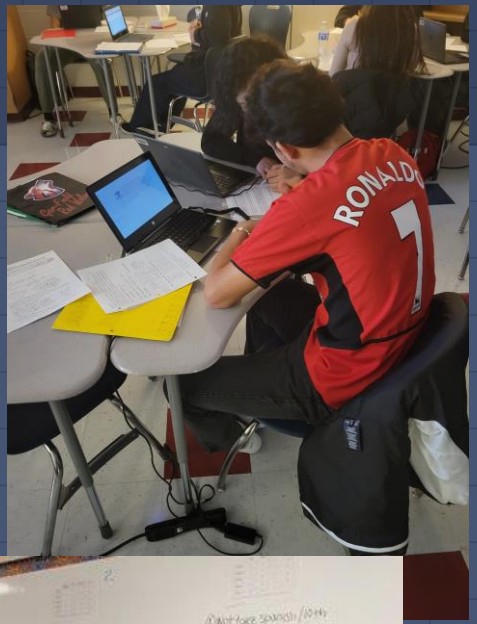
- Collaborative working groups
- Low stress (like minded/like language)
- Grading (immediate feedback)
- Low stakes (quick checks for understanding)

What does it look like?

Implement tasks that promote reasoning and problem solving Teacher and student actions	
What are *teachers* doing?	**What are *students* doing?**
Motivating students' learning of mathematics through opportunities for exploring and solving problems that build on and extend their current mathematical understanding. Selecting tasks that provide multiple entry points through the use of varied tools and representations. Posing tasks on a regular basis that require a high level of cognitive demand. Supporting students in exploring tasks without taking over student thinking. Encouraging students to use varied approaches and strategies to make sense of and solve tasks.	Persevering in exploring and reasoning through tasks. Taking responsibility for making sense of tasks by drawing on and making connections with their prior understanding and ideas. Using tools and representations as needed to support their thinking and problem solving. Accepting and expecting that their classmates will use a variety of solution approaches and that they will discuss and justify their strategies to one another.

What does it look like?





Results after 2 years of full implementation

AFDA Course Failure Rates				
	All Students	SWD	Dual Identified	EL
2018 – 19				
2020 – 21				
2021 – 22				
2022 – 23				

What can you do??

Turn and talk to a neighbor

- What do you think is your biggest barrier to starting to implement student-centered tasks in your classroom?
- Be ready to share!

Brand New World!

- Birds of a Feather
- Transition from tests to projects
- Same course, new school

By the way….

Questions?

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