Mild to Spicy—
Turning up the Heat on Math Rigor

What does rigor mean to you?

Menti Presentation

There is no GROWTH in a comfort zone
And
No COMFORT in a growth zone.

Can you count to 3?

Learning Intention: I will learn how to count to 3 with a friend.

Success Criteria: I can count to 3, repeatedly, without a pause, with a friend.

From Mild to Spicy

Learning Intention:

Participants will learn the how to evaluate for rigor.

Participants will learn the importance of having the correct level of rigor for both assessments and learning materials.

Participants will reflect on how turning up Rigor for student learning requires both the right dispositions and rigorous work on the part of the teacher.

Success Criteria:

Participants can analyze assignments and assessments for rigor. Understanding that DOK levels and difficulty are not the same thing.

Participants can adjust rigor in assessments and instruction using materials that they already use in their classroom.

Participants can identify several dispositions that a teachers needs to have to create an classroom environment where rigorous learning is the norm and reflect on which of those dispositions they may want to develop.

Meet the Passengers: Our trip from mild to spicy

Mild 🌶️

Stephanie

- 1st year teaching
- 8th grade math

Medium 🌶️🌶️

Jenna

- 18 years of classroom teaching experience
- 1st to 8th grade
- Currently teaching 7th grade math–7th year

Hot 🌶️🌶️🌶️

Paula

- 27 years of experience teaching math
- One year as an instructional coach

Spicy 🌶️🌶️🌶️🌶️

Shelley

- District Director of Teaching and Learning
- 29 years of experience in education, focus on Special Education

The Catalyst

Stephanie— "The Newbie"

Experience

- 7 years in the school system before becoming a first-year math teacher
- Worked as a paraeducator and led The Literacy Project Phonics program

Inspiration Behind My Classroom Ideas

- Drawn from my experience as a mother of a 7th and a 9th grader
- Influenced by my spouse's role as a middle school teacher
- Combining real-life parenting and teaching insights in hopes to create an effective learning environment

Roadmap- a year of learning and leading

1. After being hired, I focused on increasing rigor to better prepare students for success on the RISE exam.

2. Attended a RISE conference at the start of summer to learn strategies for increasing rigor

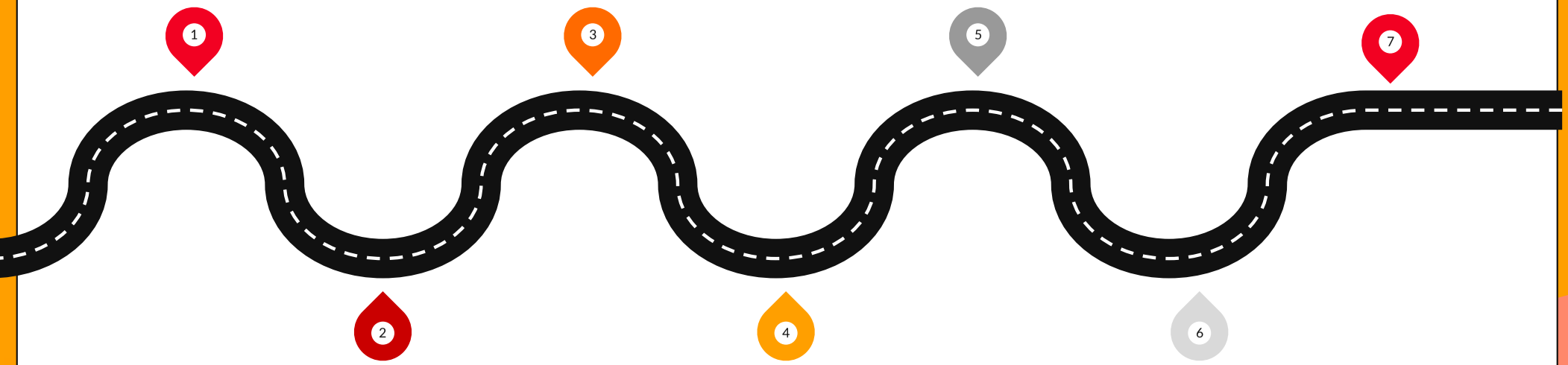
3. Evaluated and revised test DOK levels using the Blueprint, then aligned lessons to match unit math rigor.

4. Created classroom policies aligned with my goals and positive teaching disposition

5. Coaches observed my lessons to support and guide ongoing growth by identifying what worked well and what to improve.

6. Continued providing rigorous opportunities through reviews and games to reinforce learning.

7. **RISE Results:** Maintained the same level of proficiency as a veteran teacher.



Always Improving

Jenna's Approach-If you always do what you've always done, you'll always get what you've always got.

WHY: RISE scores not where I wanted them, audience has changed.

Approach: Work Backwards, start from the assessment, match the teaching and practices.

Look at RISE Blueprint to match the classroom assessments with DOK levels.

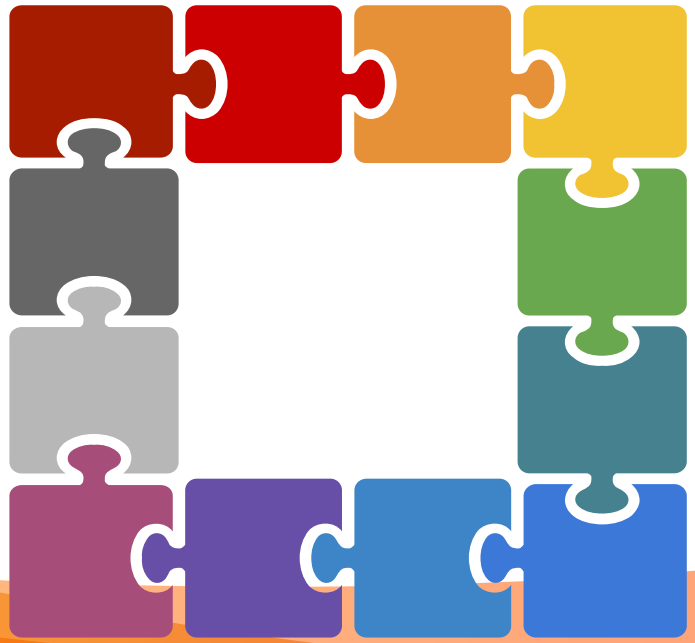
What did I do?
Programs to help (Magma Math, Performance Matters)
Identify DOK Levels, match the RISE Blueprint

Looking Ahead:
Rewriting curriculum to match assessments.
Looking at practices, target audience.
Adding other student accountability pieces.

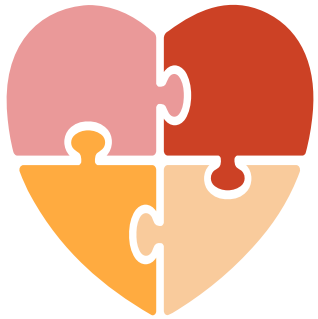
Test Results—
22-23- Maintained Proficiency level
23-24-Increased Proficiency level by 2%
24-25- Increased Proficiency level by 32%

Coaches Impact

How did Paula and Cindy support the teachers?



At the Start of the Year, Stephanie had the Pieces of a Vision—But Needed Support to Connect Them



RISE blueprints

Use RISE blueprints to guide the DOK levels for summative assessments.

Grade 8
50 Operational Items

Domain	Min.	Max.
Functions	20%	24%
Expressions and Equations	20%	24%
Geometry / The Number System	34%	40%
Statistics and Probability	16%	20%
DOK 1	20%	30%
DOK 2	40%	50%
DOK 3	20%	26%

DOK
Reviewed standards. Paula used the RISE PLD Matrix to determine DOK levels

RISE PLD Mathematics Grade 8

PLD	Standard	Below Proficient	Approaching Proficient	Proficient	Highly Proficient
Policy		The Level 1 student is below proficient in applying mathematics knowledge/ skills as specified in the Utah Core State Standards. The student generally performs significantly below the standard for the grade-level/course, is likely able to partially access grade level content and engages with higher order thinking skills with extensive support.	The Level 2 student is approaching proficient in applying mathematics knowledge/skills as specified in the Utah Core State Standards. The student generally performs slightly below the standard for the grade level/course, is able to access grade-level content and engages in higher order thinking skills with some independence and support.	The Level 3 student is proficient in applying mathematics knowledge/skills as specified in the Utah Core State Standards. The student generally performs at the standard for the grade level/course, is able to access grade-level content, and engages in higher order thinking skills with some independence and minimal support.	The Level 4 student is highly proficient in applying mathematics knowledge/ skills as specified in the Utah Core State Standards. The student generally performs significantly above the standard for the grade level/course, is able to access above grade-level content, and engages in higher order thinking skills independently.
Number System					
		The Level 1 Student:	**The Level 2 Student:**	**The Level 3 Student:**	**The Level 4 Student:**
Range	8.NS.1	Identifies square roots of non-square numbers and pi as irrational numbers. Understands that every number has a decimal expansion.	Compares and orders rational and irrational numbers. Identifies irrational decimal expansions as approximations.	Places irrational numbers on a number line.	Explains how to get more precise approximations of square roots.
Range	8.NS.2	Identifies rational or irrational numbers and converts familiar rational numbers with one repeating digit to fraction form.	Identifies rational and irrational numbers and converts less familiar rational numbers to fraction form.	Uses approximations of irrational numbers to estimate the value of an expression.	Notices and explains the patterns that exist when writing rational numbers as fractions.
Range	8.NS.3	Calculates the sum or difference of two radicals. Evaluates the square root of perfect squares and cube root of perfect cubes.	Calculates the product or quotient of two radicals. Simplifies radicals including square roots.	Performs all four operations with radicals. Simplifies radicals including square roots and cube roots.	Performs operations on radicals in real-world and complex mathematical situations.
Expressions and Equations					
		The Level 1 Student:	**The Level 2 Student:**	**The Level 3 Student:**	**The Level 4 Student:**
Range	8.EE.1	Knows the properties of natural number exponents.	Applies the properties of natural number exponents to generate equivalent numerical expressions.	Knows and applies the properties of integer exponents to generate equivalent numerical expressions.	Uses properties of integer exponents to order or evaluate multiple numerical expressions with integer exponents.
Range	8.EE.2	Evaluates square roots of small perfect squares.	Solves mathematical equations (without context) of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational	Uses square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$,	Explains how square roots and cube roots relate to each other and to their radicands.

This document is found under Utahrise.com, under resources.

There is a link in the padlet.

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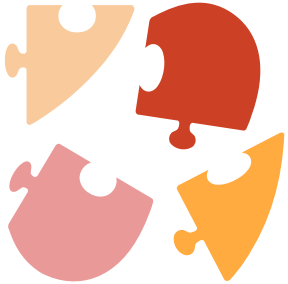
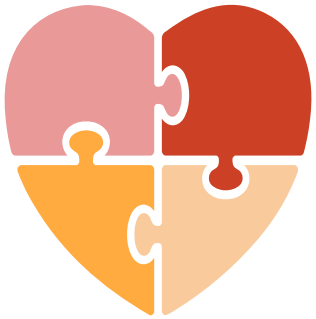
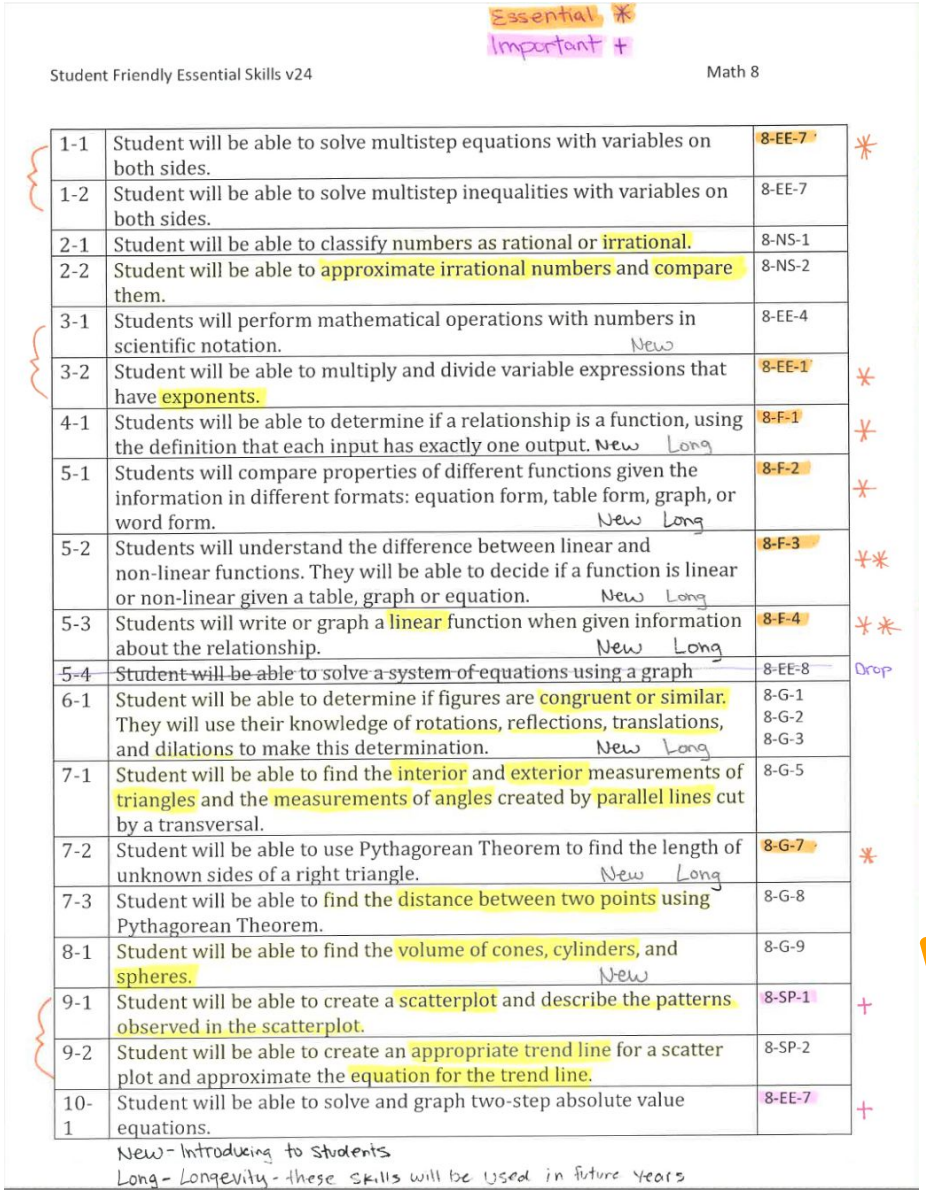




DOK
Used the RISE PLD Matrix to determine DOK levels

Conference
Learned about using the RISE Blueprint as a guide to match DOK

Standards
Sifted through core standards



Essential *
Important +

Student Friendly Essential Skills v24 Math 8

1-1	Student will be able to solve multistep equations with variables on both sides.	8-EE-7	*
1-2	Student will be able to solve multistep inequalities with variables on both sides.	8-EE-7	
2-1	Student will be able to classify numbers as rational or irrational.	8-NS-1	
2-2	Student will be able to approximate irrational numbers and compare them.	8-NS-2	
3-1	Students will perform mathematical operations with numbers in scientific notation. New	8-EE-4	
3-2	Student will be able to multiply and divide variable expressions that have exponents.	8-EE-1	*
4-1	Students will be able to determine if a relationship is a function, using the definition that each input has exactly one output. New Long	8-F-1	*
5-1	Students will compare properties of different functions given the information in different formats: equation form, table form, graph, or word form. New Long	8-F-2	*
5-2	Students will understand the difference between linear and non-linear functions. They will be able to decide if a function is linear or non-linear given a table, graph or equation. New Long	8-F-3	**
5-3	Students will write or graph a linear function when given information about the relationship. New Long	8-F-4	**
~~5-4~~	~~Student will be able to solve a system of equations using a graph~~	~~8-EE-8~~	Drop
6-1	Student will be able to determine if figures are congruent or similar. They will use their knowledge of rotations, reflections, translations, and dilations to make this determination. New Long	8-G-1 8-G-2 8-G-3	
7-1	Student will be able to find the interior and exterior measurements of triangles and the measurements of angles created by parallel lines cut by a transversal.	8-G-5	
7-2	Student will be able to use Pythagorean Theorem to find the length of unknown sides of a right triangle. New Long	8-G-7	*
7-3	Student will be able to find the distance between two points using Pythagorean Theorem.	8-G-8	
8-1	Student will be able to find the volume of cones, cylinders, and spheres. New	8-G-9	
9-1	Student will be able to create a scatterplot and describe the patterns observed in the scatterplot.	8-SP-1	+
9-2	Student will be able to create an appropriate trend line for a scatter plot and approximate the equation for the trend line.	8-SP-2	
10-1	Student will be able to solve and graph two-step absolute value equations.	8-EE-7	+

New - Introducing to students
Long - Longevity - these skills will be used in future years

Identified Essential Skills

Based on:

- endurance–longevity
- leverage–used in other areas
- readiness–building block for future

No essential skills??? *

Use RISE Blueprint!!!

Be realistic

Doing this for ALL assessments in one year is unrealistic

Standards
Sifted through core standards

Let's Talk about DOK

How confident are you with your understanding of DOK for your core?

Mentimeter activity

DOK is about intended outcomes, not difficulty.

The Depth of Knowledge is NOT determined by the verb (Bloom's Taxonomy), but by the context in which the verb is used and the depth of thinking required.

DOK Level 1: Recall & Reproduction

DOK Level 2: Skills & Concepts

DOK Level 3: Strategic Thinking/Reasoning

DOK Level 4: Extended Thinking

For more detailed information, refer to your handout

Same Verb - Different DOK Levels

- DOK 1- Describe three characteristics of metamorphic rocks. *Requires simple recall*
- DOK 2- Describe the difference between metamorphic and igneous rocks. *Requires cognitive processing to determine the differences in the two rock types*
- DOK 3- Describe a model that you might use to represent the relationships that exist within the rock cycle. *Requires deep understanding of rock cycle and a determination of how best to represent it*

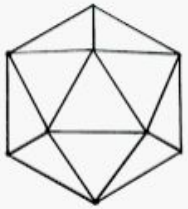
DOK vs . Difficulty

What shape is this?

A. Circle
B. Square
C. Triangle
D. Rectangle

DOK: 1
Difficulty: Easy

What shape is this?



A. *Tetrahedron*
B. *Octahedron*
C. *Icosahedron*
D. *Dodecahedron*

DOK: 1
Difficulty: Hard

You Try!

Classify each task as DOK 1, 2, or 3.

1. Students will perform a composite transformation of a geometric figure within a coordinate plane.

DOK 2

2. Students will perform a geometric transformation to meet specified criteria and then explain what does or does not change about the figure using their model.

DOK 3

3. Students will identify a transformation of a geometric figure within a coordinate plane.

DOK 1

DOK vs. Difficulty

Elements that help classify DOK and Difficulty:

DOK

Cognitive Complexity
Kind and level of thinking
Number of mental steps
Planning
Decision-making
*Standard and Grade level

Difficulty

Number type and length
Number of variables or symbols
Vocabulary
Formulas
Units
Patterns

***As students progress through more advanced levels of mathematics, some skills become more procedural/habitual, so the same task can be different DOK levels for varying grades.**

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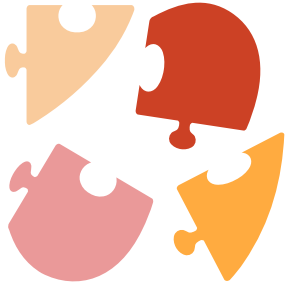

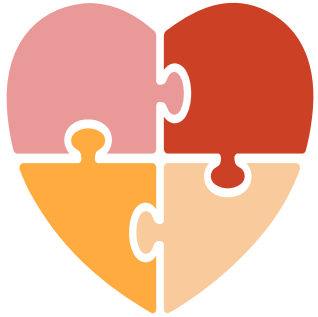

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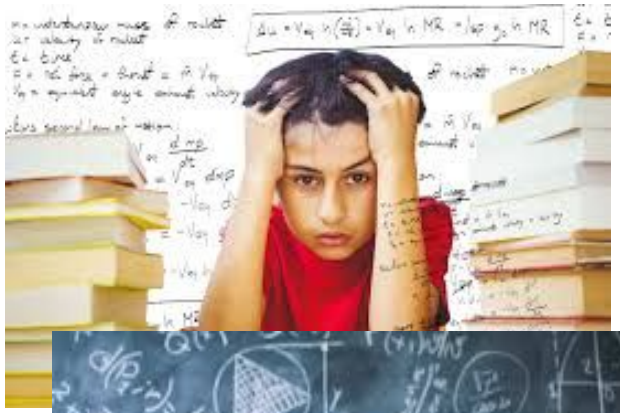
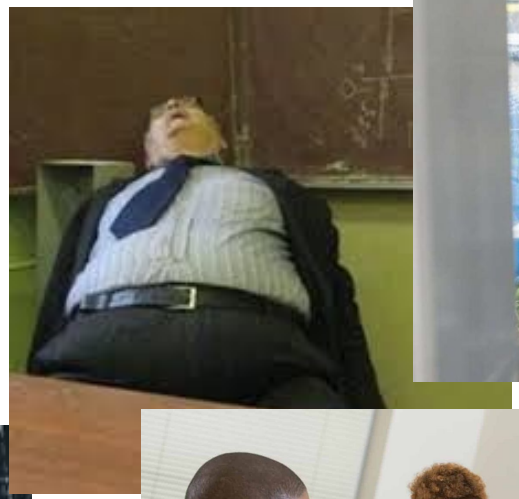
Wanted feedback throughout the year to make adjustments

Disposition
Classroom policies, Attitude, Our bet

Other Results





Making the invisible—visible.

1. Collective Teacher Efficacy 1.34
2. Self-Reported Grades 1.33
3. Teacher Estimates of Student Achievement 1.29
4. Cognitive Task Analysis 1.29

From Mild to Spicy

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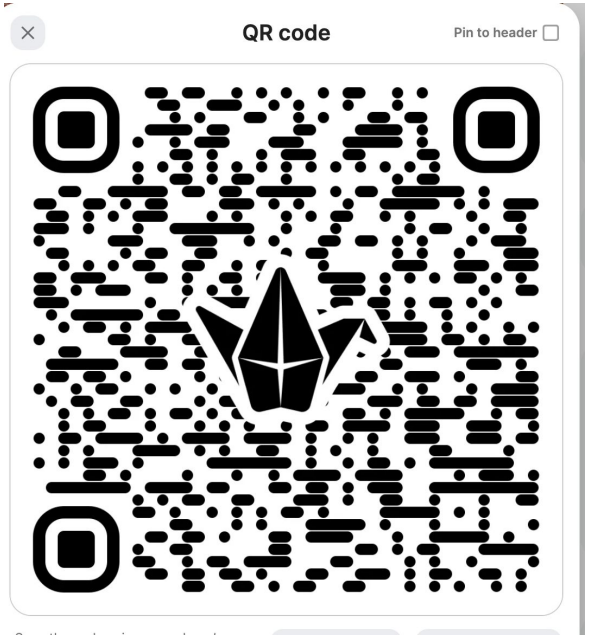
Wrap-up

Take-away

Padlet with resources.



Thank you for coming!