

Building the Thinking Not Just the The Classroom

How to move past random groups
and using vertical non-permanent
surfaces





Today's Agenda



01

PreFlection

Where are you now?



02

The Status Quo

What BTC may look like in your school/classroom.



03

The Dynamic Difference

Going beyond VNPS & RGs!



04

Analyze

What is the difference?



05

The Playbook

How do we move?



06

Post Flection

How do this connect to you?





01

Preflection

1. What is the purpose of using vertical boards?
2. What instructional strategies have to be in place to support this purpose?
3. How does the task support this purpose?

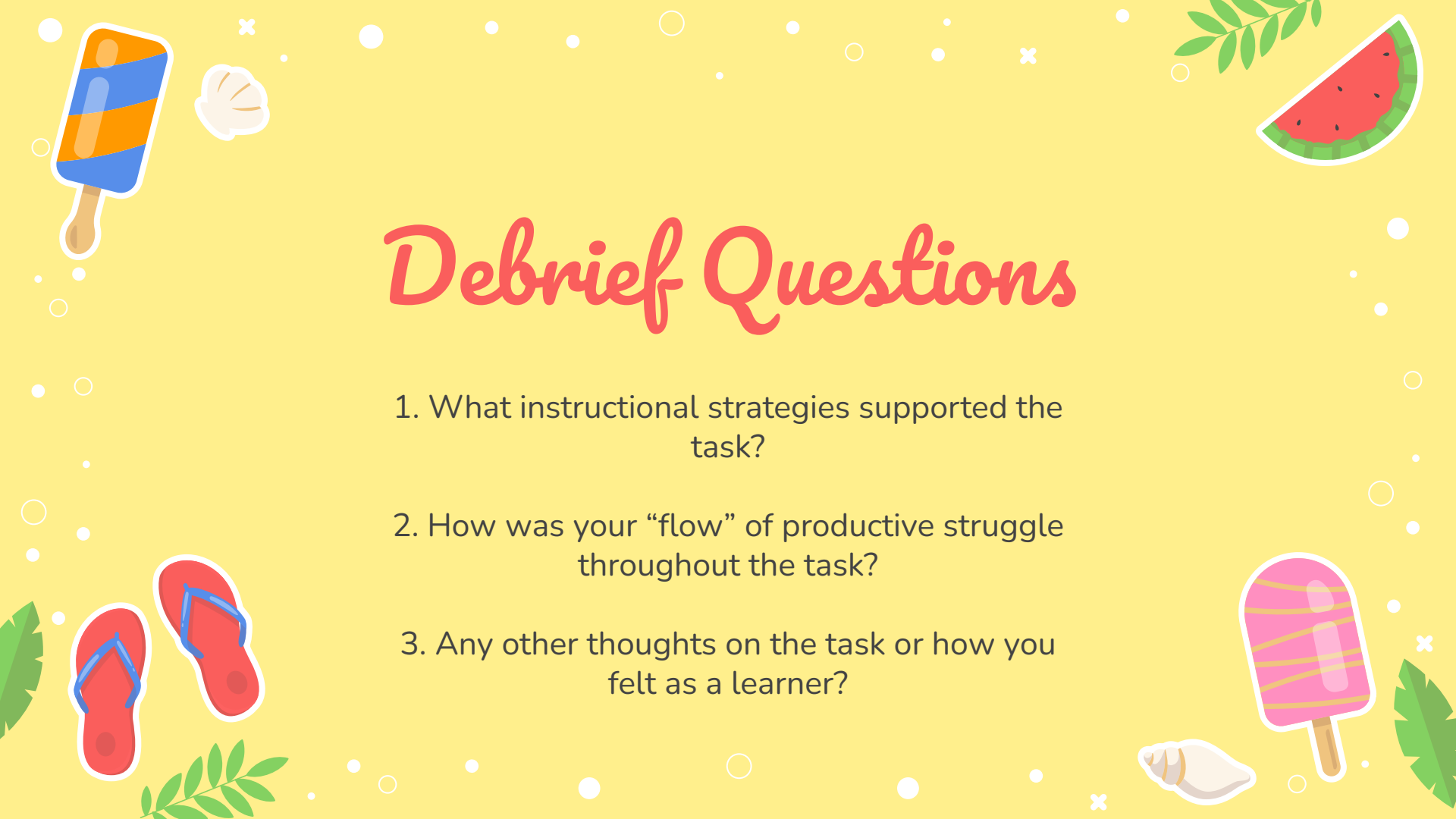


02

Task 1

Create five different expressions that equal 11, 12, 13, 14, 15.

Your expressions have to start with the number 1.
You can only multiply by 2 and add 5.
Grouping symbols are allowed.



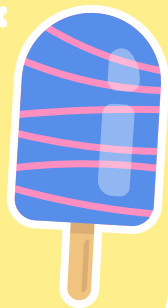
Debrief Questions

1. What instructional strategies supported the task?
2. How was your “flow” of productive struggle throughout the task?
3. Any other thoughts on the task or how you felt as a learner?

03

Task 2

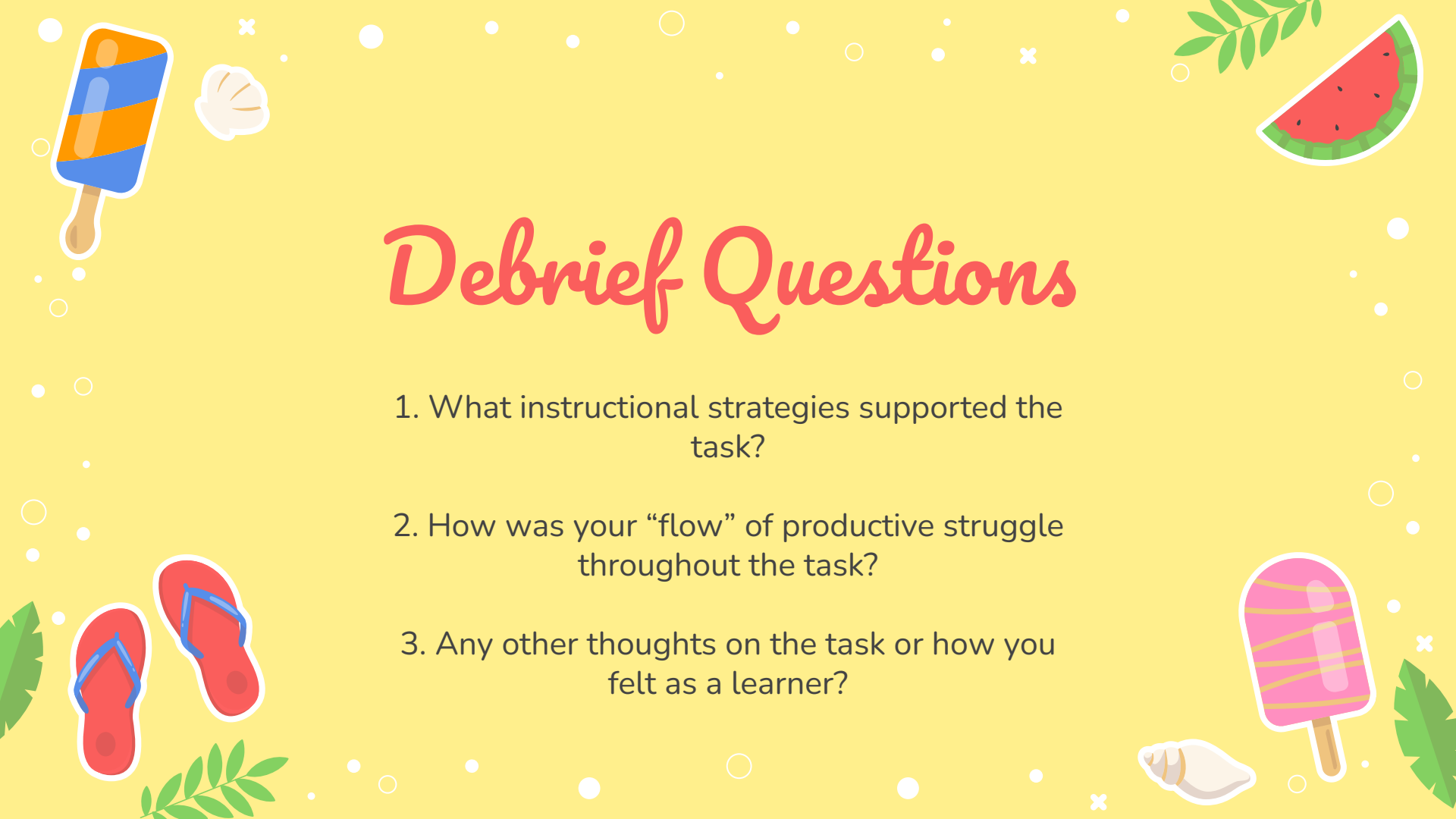
Using consecutive integers
and summation



Mild / Medium / Spicy

<https://sites.google.com/fpsct.org/btcpractice>





Debrief Questions

1. What instructional strategies supported the task?
2. How was your “flow” of productive struggle throughout the task?
3. Any other thoughts on the task or how you felt as a learner?

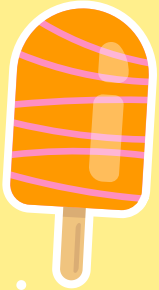
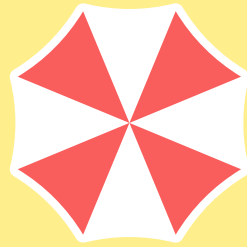


04

Analyze

What were the differences between the task itself and instructional strategies from task 1 to task 2?

The Differences (BTC Instruction)



Launch

Use a story or hook students at the start.

Board Structure

Explicit routines, organize student work, and build vulnerability

Hints, Extensions, Keys

Is this right? Now what? What should we do next?

Consolidation

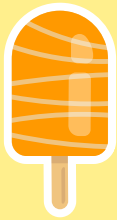
Note Making versus Note Taking

Practice

Mild / Medium / Spicy, Small Group Instruction



The Differences (The Task)



Engaging Qualities

Thin Slice, Real World Scenarios, Extensions, Challenge, Student Choice



Academic Strategies

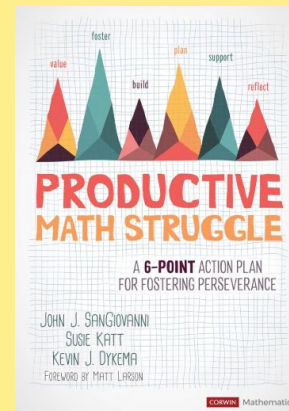
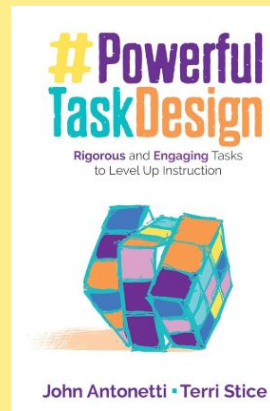
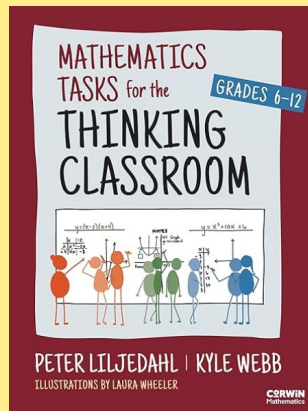
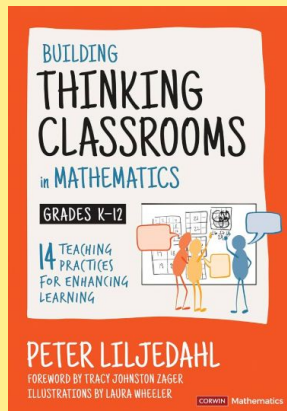
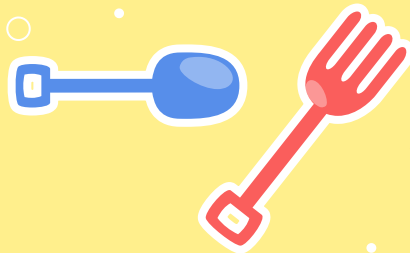
Similarities/Differences, Patterns, Make Thinking Public, Summarize and Make Meaning

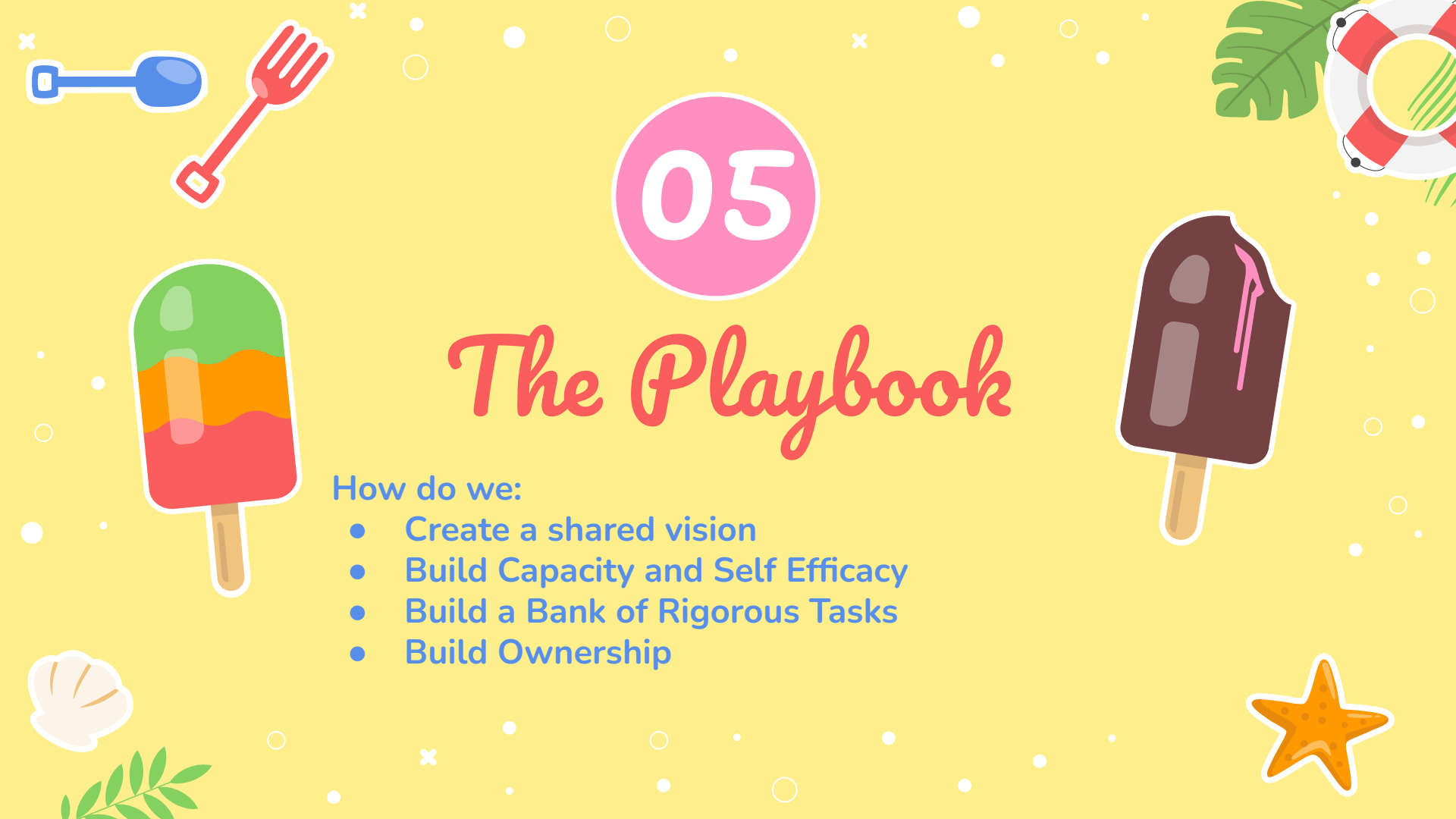


Cognitive Demand

Inquiry, Group Accountability, Individual Work, Student Choice,







05

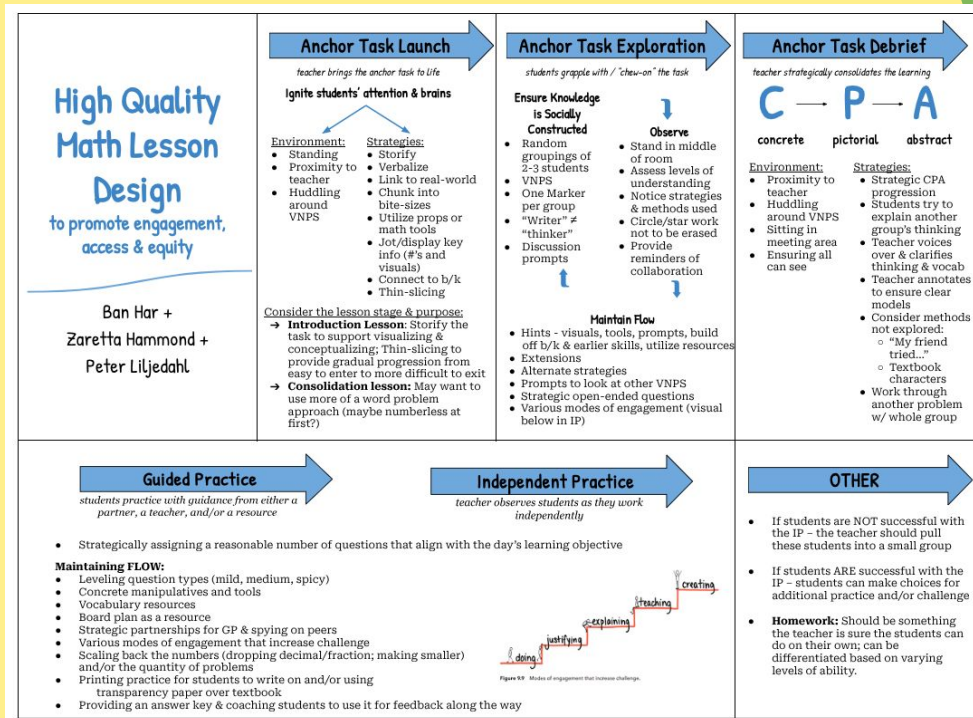
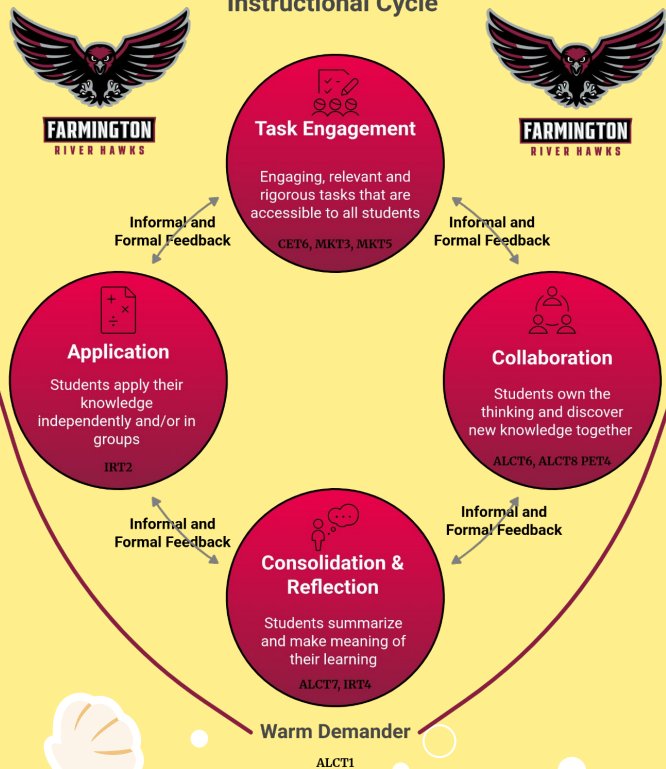
The Playbook

How do we:

- Create a shared vision
- Build Capacity and Self Efficacy
- Build a Bank of Rigorous Tasks
- Build Ownership

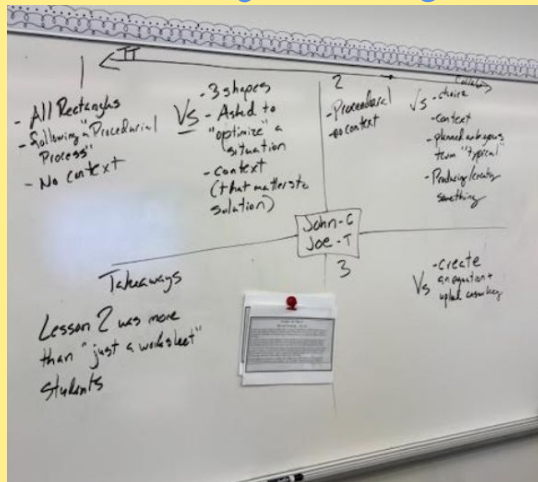
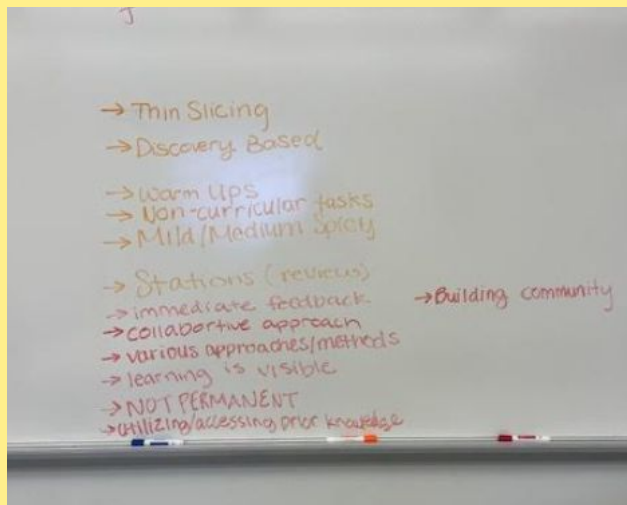
Building a Shared Vision

High Leverage Math & Business Instructional Cycle





Build Capacity



- Week One - 10/16
[Reconsidering Random Generators](#)
- Week Two - 10/22
[This or That / Would You Rather](#)
- Week Three - 10/29
[Collaboration Continuums](#)
- Week Four - 11/5
[Getting All Students on the Train](#)
- Week Five - 11/11
[Note-Making and the Four Quadrants](#)
- Week Six - 11/18
[Thin-Sliced Lesson Flow](#)
- Week Seven - 12/3
[Thin-Slicing Variation](#)

- I like the conversations, it's good to give a bit more context and feel like I can also let you know how I thought things went or context around the why of some things. I don't mind written but I prefer the conversation.
- I liked the conversation as we were able to deconstruct the class while it was still fresh in our memories. Receiving only written feedback days later is useful, but necessitates having to think back through the lesson through the fog of time.
- To me it felt more authentic and more of a conversation. I like the written model for the sole purpose of having it as continuous feedback. Personally, I reflect better through a conversation than through putting words on a paper.
- I enjoy the conversation model because it allows us to collaborate and talk about what went right and what improvements could have been made, where the written feedback is not a back and forth.





Rigorous Tasks

Powerful Task Diagnosis Sheet - Adapted from *Powerful Task Design* (Antonetti & Stice, 2018)

Overview: A Powerful Task is a Rigorous Task. "Rigor occurs when learners formulate their own unique thoughts of content and strategy and are engaged enough to persevere." - *PTD*, p. 34.

Starting Point: "A task is only as powerful as the question underneath it." (PTD, p. 109); Analyze the question/teaching consideration at the task's core.

- ☐ Closed with a single right answer and/or approach → How and how soon will students apply the right answer/approach to a new or novel situation?
- ☐ Closed but with a "Choice" of a few right answers and/or approaches. → How can I make this question more open-ended or have a range of possible answers?
- ☐ Open with a broad range of possible answers and/or approaches. → How will I ensure students' varied original ideas align with accepted meaning?

Criteria 1 - Engaging Qualities: Will the task capture students' attention and curiosity? Will they find the task meaningful and worth doing because it connects to their lives, interests, or a real audience or purpose?

Criteria 2 - Academic Strategies: Humans use a small set of strategies to construct unique and new ideas about content. Which of these strategies will students use?

Criteria 3 - Cognitive Demand: In what ways will students demonstrate their thinking as individuals (perhaps as a result of collaboration)? Note - Rigorous thinking occurs at [Bloom's](#) Level 3 (analyze) and up.

True Engaging Qualities (Relevance/Purpose)

- ☐ Develop and Defend My Own Original Ideas
- ☐ Agree and/or Disagree with Others and Explain Why
- ☐ Connect my Ideas to those of Others
- ☐ See/Hear Others Connect My Ideas
- ☐ Present to an Important Audience I Care About
- ☐ Create a Product with Proof of Concept
- ☐ Find and/or Create a Real Example(s)

High-Leverage Academic Strategies

- ☐ Find Similarities and Differences
- ☐ Compare and Contrast by Trait
- ☐ Develop a System of Classification/Organization
- ☐ Create a Metaphor or Analogy about Content
- ☐ Summarize or Note-Make
- ☐ Create a New Representation or Model (often nonlinguistic)
- ☐ Generate and Test an Original Hypothesis
- ☐ Identify and Extend Patterns

Levels of Thinking Across the Rigor Divide

- ☐ Infer with Support/Evidence
- ☐ Find or Compare Patterns
- ☐ Find Use for/Cause of Patterns
- ☐ Augment/Interrupt Patterns
- ☐ Make Connections When Doing Procedures
- ☐ Argue, Defend, or Justify
- ☐ Make Sense Of..
- ☐ Extend Thinking to a New Scenario

***** The Rigor Divide *****

Non-Truly Engaging Qualities ("Glitter")

- ☐ Take Turns Talking
- ☐ Present to a Partner(s)/The Class
- ☐ Recall/Restate in a Fun or Novel Way
- ☐ Listen and Repeat
- ☐ Produce w/o Connections to Concept(s)
- ☐ Find and Repeat Real/Known Examples

Low-Leverage Academic Strategies

- ☐ List facts about...
- ☐ Copy from One Place to Another
- ☐ Restate
- ☐ Place Accepted Meaning in Another Form
- ☐ Restate a "Known" or Accepted Pattern

Low Level or "Shallow" Thinking

- ☐ Recall/Find an Example Of...
- ☐ Name the Steps
- ☐ Repeat Facts/Truth/Accepted Meaning
- ☐ Memorize
- ☐ Follow the Steps/Procedure
- ☐ Restate Accepted Meaning in Other Form





Rigorous Tasks

Powerful Task Design			UDL	Purposeful Collaboration	BTC Strategies	Consolidation of Learning
Cognitive Demand	Academic Strategies	Engaging Qualities				
- Progress Checks (Entrance/Exit Tickets) → a way to individually check student understanding - Open-ended with multiple different answers - Low flow / high ceiling - Support and justify answers with reasoning - Thinking past the procedural understanding - Student-created questions - Building graphs when given characteristics - Create equations to model real-world situations - Apply learning to new situations - Adding more variables as the tasks go on - Error analysis - My favorite mistake - Novel tasks - Combining multiple learning targets - Find patterns	- Thin Slicing - Inquiry approach - Student choice (mild/medium/spicy) - Metacognitive reflections - Just in time versus just in case - Making comparisons, similarities, and differences - Categorizing or classification - Brain dump - Sorting or ranking - Connect previous learning to current - Students helping other students after they finish - Random groups - Create a model	- Seeing <u>real world</u> application through a lens that interests them - Student choice in problems and products - Creation of Public Products - Familiar contexts for sustained inquiry - Guess first before solving - Which one doesn't belong - Create your own example - Competition - Sorting	- Scaffolds at the ready - Low floor, high ceiling - Multiple entry points - Hint Cards - Extension Cards - Note catchers - Guaranteed cognitive demand	- Assigning roles - Peer feedback - Random Groups - Group worthy tasks - Glow & Grows - Feedback Protocol - Gallery Walks - Strategic grouping - Jigsaw - Revision protocol - Knowledge mobilization	- VNPS - Defronting the classroom - Low floor high ceiling - Random Groups - Maintaining the flow - Error analysis - Learning from other boards - Counter examples - Mild, medium, spicy problems	- Group <u>share outs</u> to create discourse/ class notes - Mind mapping - Centering Student Voices - 4 quadrant note making templates - Notes to future self - Taking pictures of student work to display different strategies - Notes for each LT/common errors from 1st attempt on boards to prepare for summative - Discussion/ recap, then students write what they want in their own words - Reflecting on formative assessment - Building a cheat sheet





Rigorous Tasks

Task 1

The town of Farmington wants to replace its old track with a new, modern circular track. The new track is designed so that it only takes 3 laps around the outermost lane to run a mile (1 mile is 1600-meters). The new track surface itself is planned to be 12 meters wide to accommodate 6 different lanes. This creates a large grassy field in the center.

The finance team needs to purchase a sprinkler system for this inner grassy field. The price is based on the total square meters (m^2) of the field:

Quote A: Charges \$15 for every 100 m^2 of area covered.

Quote B: Charges a \$500 installation fee and a rate of \$11 for every 100 m^2 .

Which option is cheaper?

Task 3

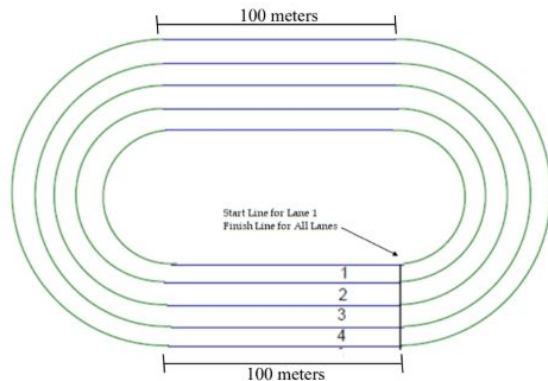
Since the new track from Task 1 will not fit, the town wants you to redesign the circular track so that it can fit within the footprint of the old track. How would you change the design? What are the new dimensions? How many lanes will you have?

LT 2.h (14b): I can apply the definitions and properties of angle and arc measures in circles. CAS 5.3
LT 2.i (14c): I can apply the definitions and properties of angles and arcs in circles to find lengths and areas. CAS 5.3

Task 2

After approving the sprinkler quote, the planning board realized the new circular track must fit within the footprint of the old track (seen in the blueprint below). The old track is a standard 400-meter track (in Lane 1). It has two 100-meter straightaways and 4 lanes that are each 2 meters wide.

Will the new circular track fit in the space where the old track was?





Rigorous Tasks

1) Rewrite the following quadratics in standard form: $f(x) = ax^2 + bx + c$

a) $f(x) = (x - 2)^2 - 9$

b) $f(x) = (x + 1)(x - 5)$

c) What do you notice?

2) Rewrite the following quadratics in standard form: $f(x) = ax^2 + bx + c$

$f(x) = -3(x + 4)^2 + 3$

2) $f(x) = -3(x + 5)(x + 3)$

c) What do you notice?

Practice: Using any strategies we've learned this year about quadratics, determine which of the following quadratic functions are equivalent to each other.

$f(x) = 3(x + 2)(x - 6)$

$f(x) = 3(x - 8)(x + 4)$

LT 8: I can write the equation of a quadratic function given key features. (CAS 3.1)

Rewrite each expression without parentheses!

1. $2(x - 1)$

2. $7x(2x + 5)$

3. $-3(x + 4) + 4$

4. $(x + 3)(x + 5) = x^2 + 8x + 15$
How does this process work?

5. $(x - 6)(x + 1) =$

6. $(x + 5)^2 = \underline{\hspace{1cm}}x^2 + \underline{\hspace{1cm}}x + \underline{\hspace{1cm}}$

7. $3(x + 5)(x + 5) - 7 =$

8. $-2(x - 1)^2 + 10 =$

9. $(4x - 1)(x + 7) = 4x^2 + 27x - 7$
How does this process work?

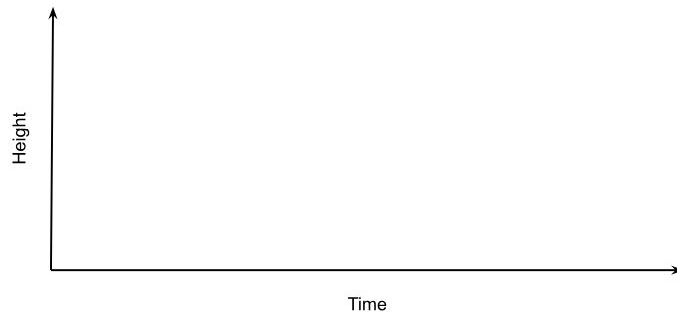
10. $(2x - 3)(x - 9) =$



Rigorous Tasks



Graphing the Hopewell Rocks Tide



Periodic Phenomenon Vocabulary

Teachers!

Ownership instead of buy in!

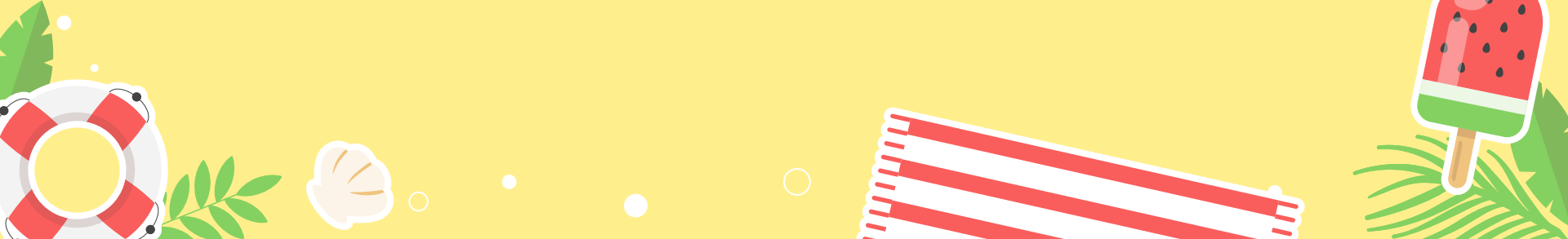


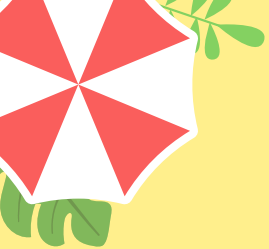


Create Your Own Timelines



Diagnosis Shared Vision Task Design Instruction



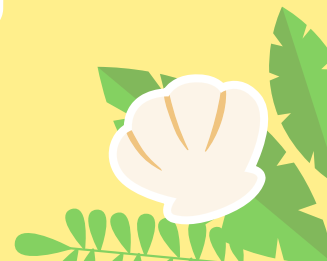


Post Flection

06

1. I use to think.... but now I think.....

2. I want my teachers to do.... so I will....



Thanks!

Any questions?



Email: kaeserj@fpsct.org

Twitter: @Mr_Kaesar

