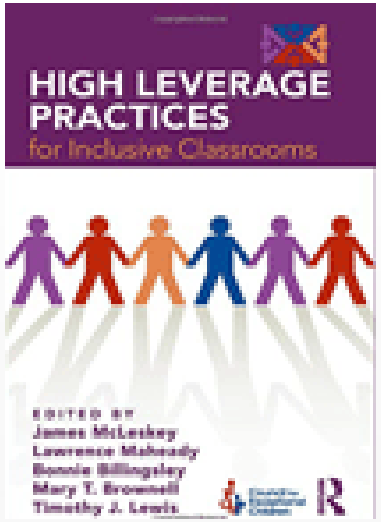
Educator Content Series: Productive Struggle

November 2020 |

Introduce yourself in chat. Please type your name and your role in mathematics education.

OSSE and the Division of Teaching & Learning

Builds the capacity of educators, from pre-service to in-service, through targeted, sustained, high-quality supports so educators can be effective in empowering each and every pre-K-12 DC learner to succeed in school and life.



High-leverage practices will be called out in yellow boxes throughout the session.

Your Facilitators

- Gabriel Cartagena
  - DCPS, Director of Secondary Math

- Tanaga Rodgers
  - OSSE, Math Content Specialist

Norms

Agreements

- Choose to be present and engaged
- Share your experience and ideas
- Assume positive intent as others share
- Be solution-minded

Online Engagement

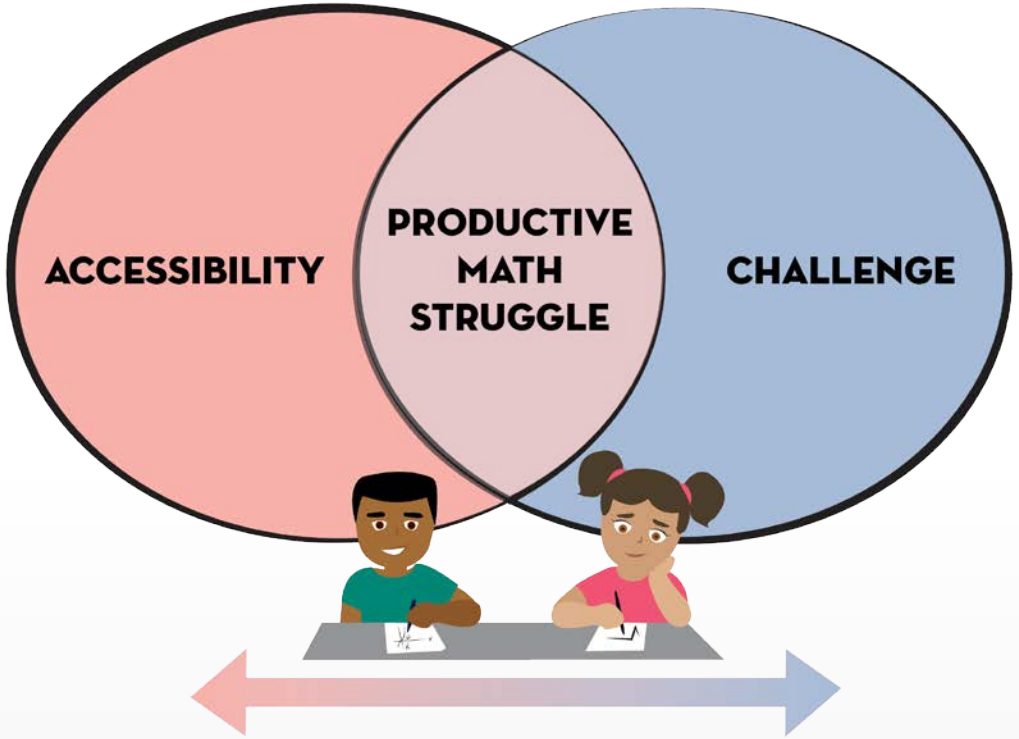
- Please use video when speaking
- Participate in chats and polls
- Keep mic on mute unless speaking to the group

Agenda & Outcomes

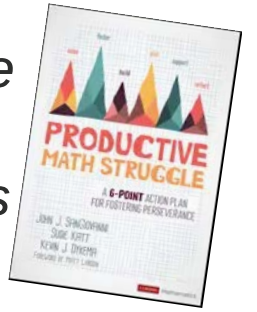
Painted Cube Math Task
Research & Recommendations
Classroom Examples
Reflection & Action

1. Share instructional strategies that support productive struggle
2. Facilitate networking and resource sharing between educators
3. Provide space to discuss challenges and potential solutions.

Productive struggle is…



"Students should grapple with concepts instead of acquiring watered-down, simplified versions of those concepts. Meeting established goals happens through engagement, discussion, and struggle that come through quality tasks."



CHAT BOX

What resonates with you from the image and/or the quote?

SanGiovanni, J., Katt, S. & Dykema, K.(2020). *Productive Struggle: A 6-point Action Plan for Fostering Perseverance.* Corwin.

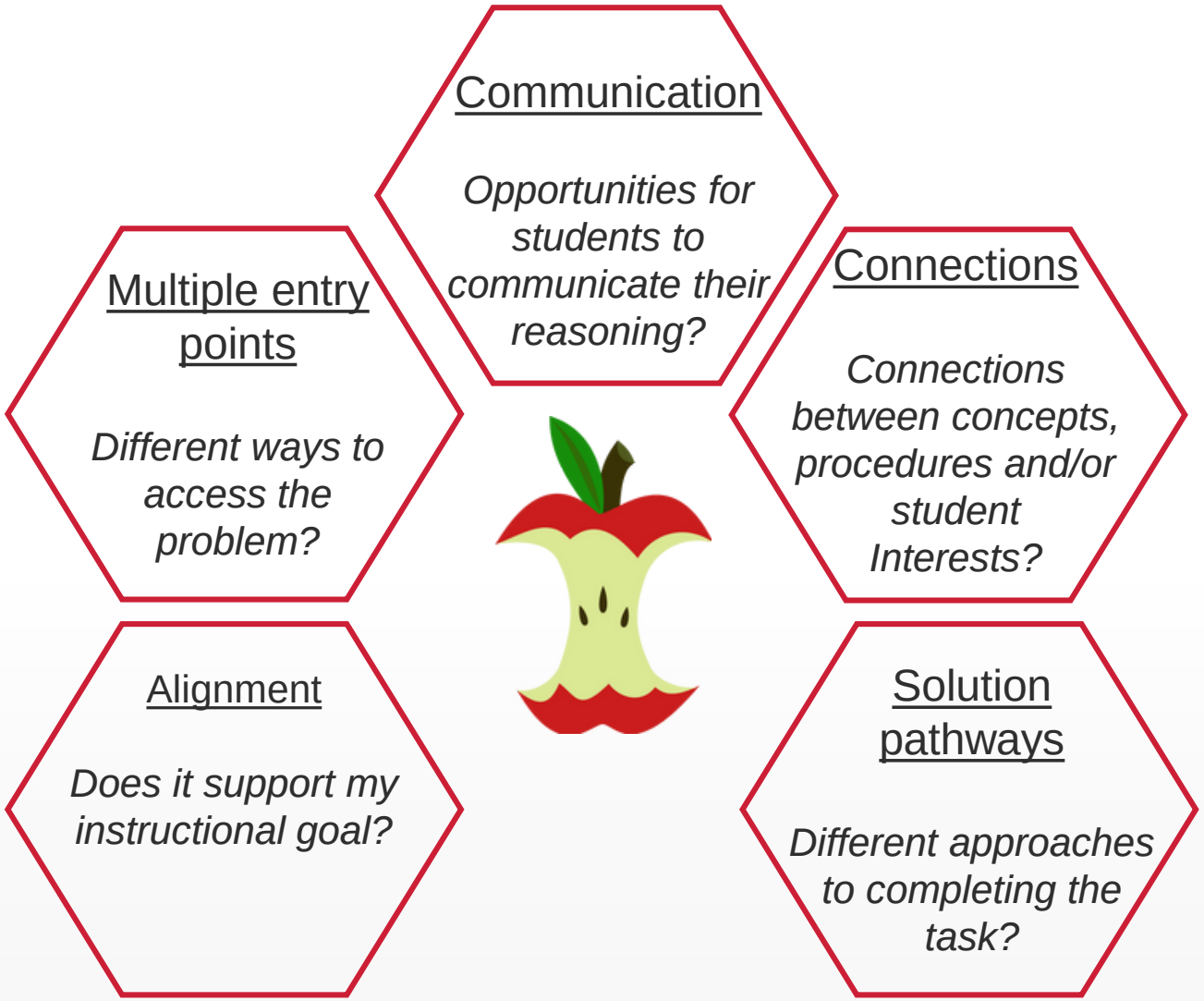
Identify and prioritize long and short-term learning goals (HLP 11)

Research & Recommendations

What types of tasks maximize the thinking necessary for struggle?

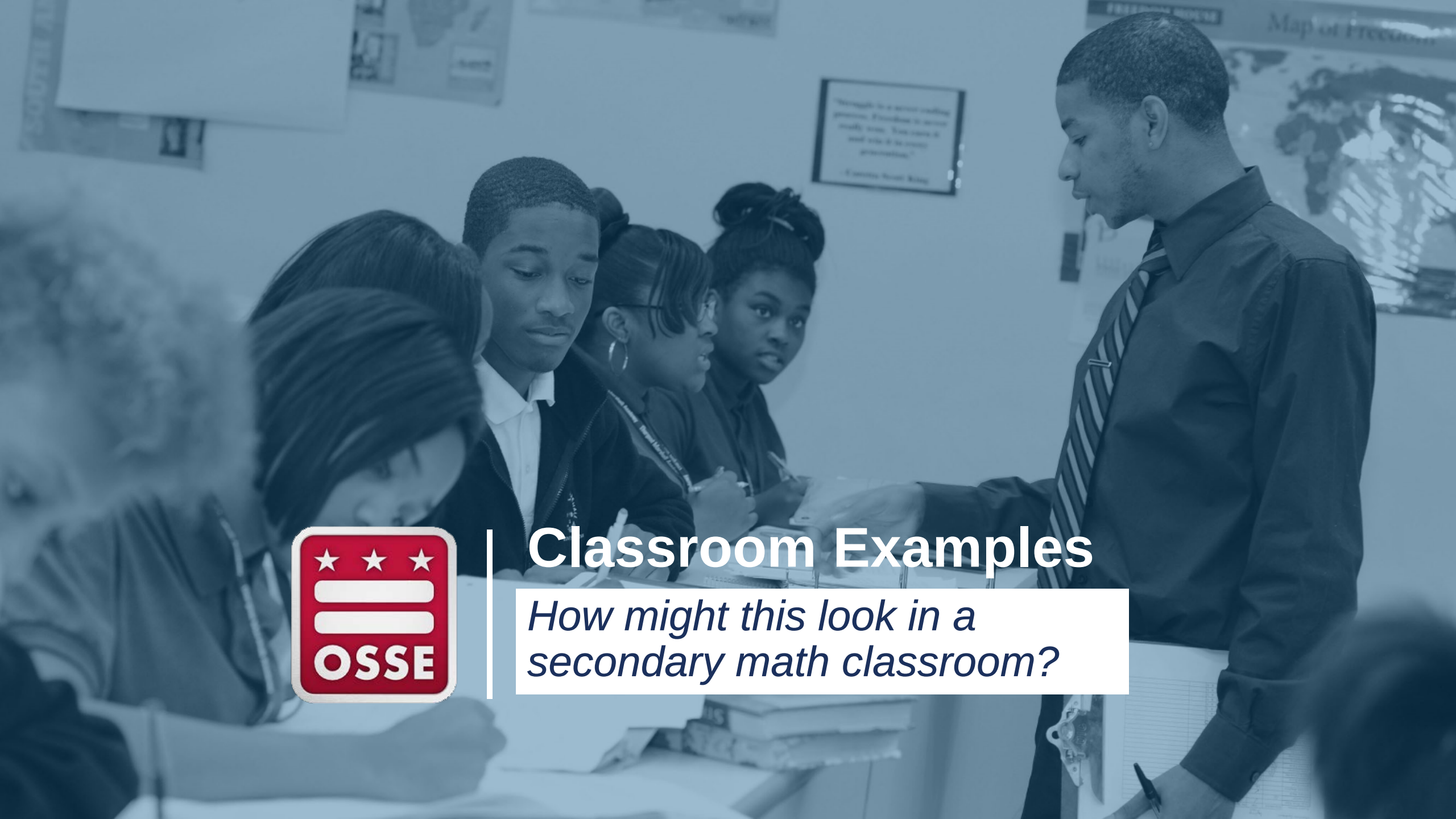
Features of high-quality math tasks

The *presence or lack* of these features will help you decide if you should use a task (or how to use a task)



Choosing a Task

Conceptual Tasks	Procedural Tasks	Application Tasks
• Sense-making • Explores representations, patterns, relationships	• Efficiency and accuracy of specific, known steps or procedures • Not necessarily quantity of problems, variety of activities	• Student considers how to represent the problem • Reasonableness



Classroom Examples

How might this look in a secondary math classroom?

Classroom Example

Procedural Tasks

- Endless problems = fatigue, disinterest
- Modifications
  - Games
  - Centers
  - Find more than a single answer
  - Creating multiple representations

Complete the equations.

-2 – (-5)	**-2 + 5**
-14 – (-4)	-14 + 4
15 – (-6)	15 + 6
7 – 11	7 + (-11)

How are the addends related in the equations in each row?

How are the solutions to the equations related in each row?

Create new equations to show if this is always true.

Modify a Task: Create a representation

Original	Modified
• Add $(2x^2 + 3x) + (5x^2 - 2x)$ $(4x^2 - 3x + 1) + (7x^2 + 8x + 2)$ $(4y^2 - 3y + 1) - (y^2 + 8y - 2)$	• Create two polynomials whose sum is $5x^2 + 3x - 4$ • Create another two polynomials whose sum is $5x^2 + 3x - 4$ • Tell how each shows $5x^2 + 3x - 4$

Opportunity to Try

OPTION 1

How might you adjust the problem to create multiple representations?

Find the volume of a rectangular prism with the dimensions of 40 inches, 3 inches and 4 inches.

OPTION 2

Consider the content you teach, what procedural task might you modify with the “create a representation” strategy?”

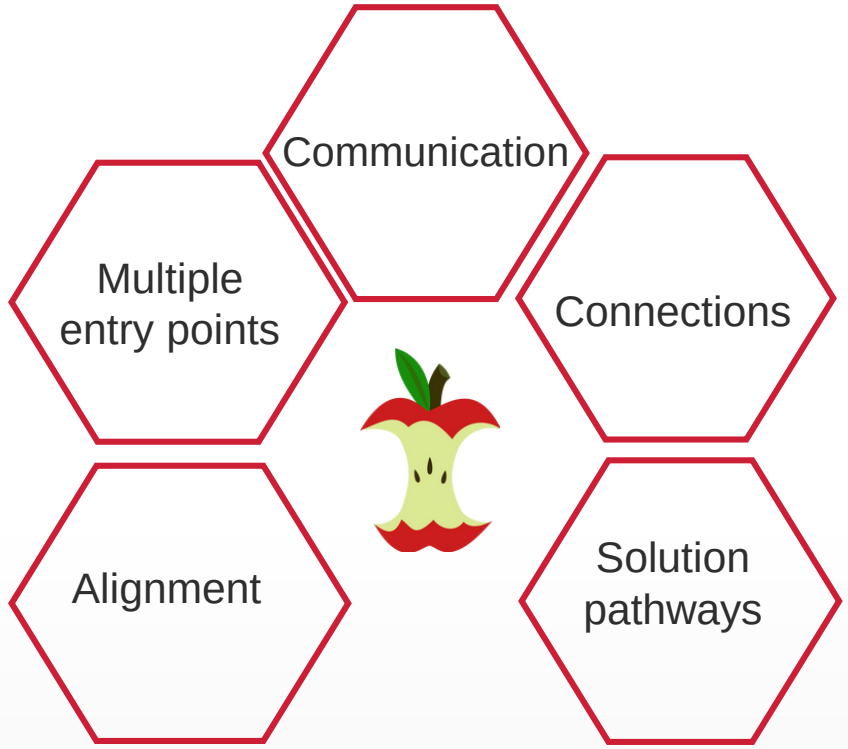
Reflection

How does this new information relate to my work?

Padlet Reflection

Answer one question below.

- What do I consider when selecting math tasks?
- Which feature is most difficult for me to consider? Why?



Padlet reflection can be found here.

Thinking Partner	• Choosing instructional materials • Planning lessons
Individual or Group Support	• Data Dives/Learning Walks • Customized
Student-Centered	• Driven by student work • Focused on student outcomes

Interested in partnering with OSSE Division of Teaching & Learning for a series like this to dig deeper into the **7 Effective Math Teaching Practices?**

LEA Partnerships & Technical Assistance Available!

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Want more Productive Struggle Resources? Scan here!