

# Math Facilitator Meeting

January 14, 2020  
Artwork by James Kranklin



# GOAL

To provide equitable  
learning opportunities  
in mathematics  
for all students  
PreK - Grade 12  
in the  
Boston Public Schools



# GOAL

## How might we achieve this goal?

- Examining each of the *Five Practices for Orchestrating Productive Mathematics Discussions* to plan for and enact math lessons from our standards-aligned math curriculum materials;
- Using these *Five Practices* to hone our own math instruction with our math curriculum materials;
- Communicating and collaborating with administrators and colleagues in our school to support *their* learning about and use of the *Five Practices*;
- Looking for and addressing the ways we may unintentionally reproduce racism and bias in our classrooms and schools;
- Understand the ways we can counter racism and bias in our classrooms and schools.



# GOAL

## Why the *Five Practices*?

*Five Practices constitute a model for effectively using student responses in whole-class discussions that can potentially make teaching with high-level tasks more manageable for teachers.*

*Discussions that focus on cognitively challenging mathematics tasks, namely, those that promote thinking, reasoning, and problem solving, are a primary mechanism for promoting conceptual understanding of mathematics*

Smith, Hughes, Engle & Stein, 2009

# AGENDA



Introductions and Overview

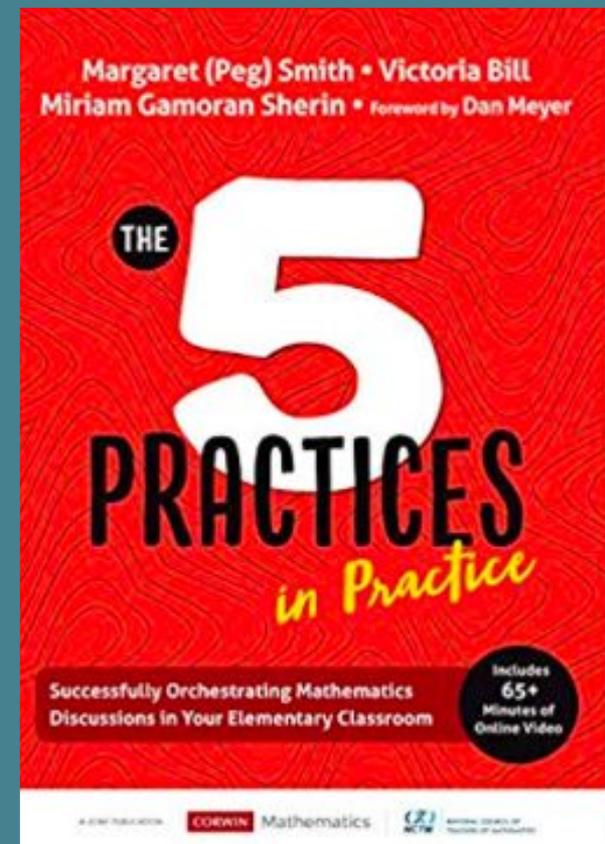
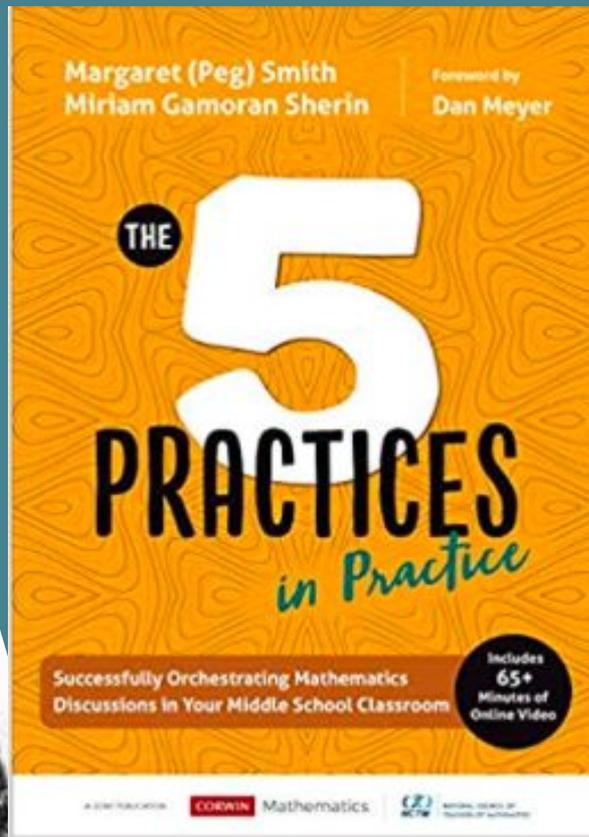
Equity and the Five Practices

Looking Back

Setting Goals

Anticipating Student  
Responses

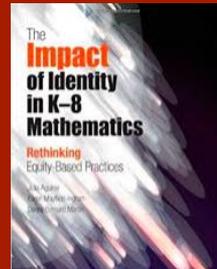
# Our Texts and Journal



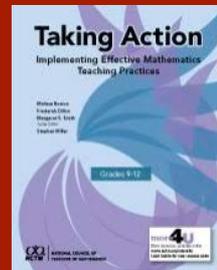
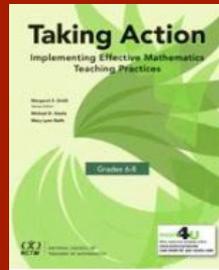
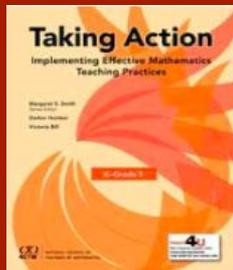
# A Brief History of Teacher Leadership Work 2015-2019



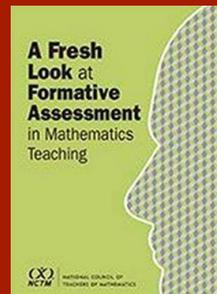
- **Eight Mathematics Teaching Practices: Principles to Actions** (NCTM) 2015-2016



- **Access, Identity, and Agency: The Impact of Identity in K-8 Mathematics: Rethinking Equity-Based Practices** (NCTM) and **Mathematics Education Through the Lens of Social Justice** (NCSM/TODOS) 2016-2017

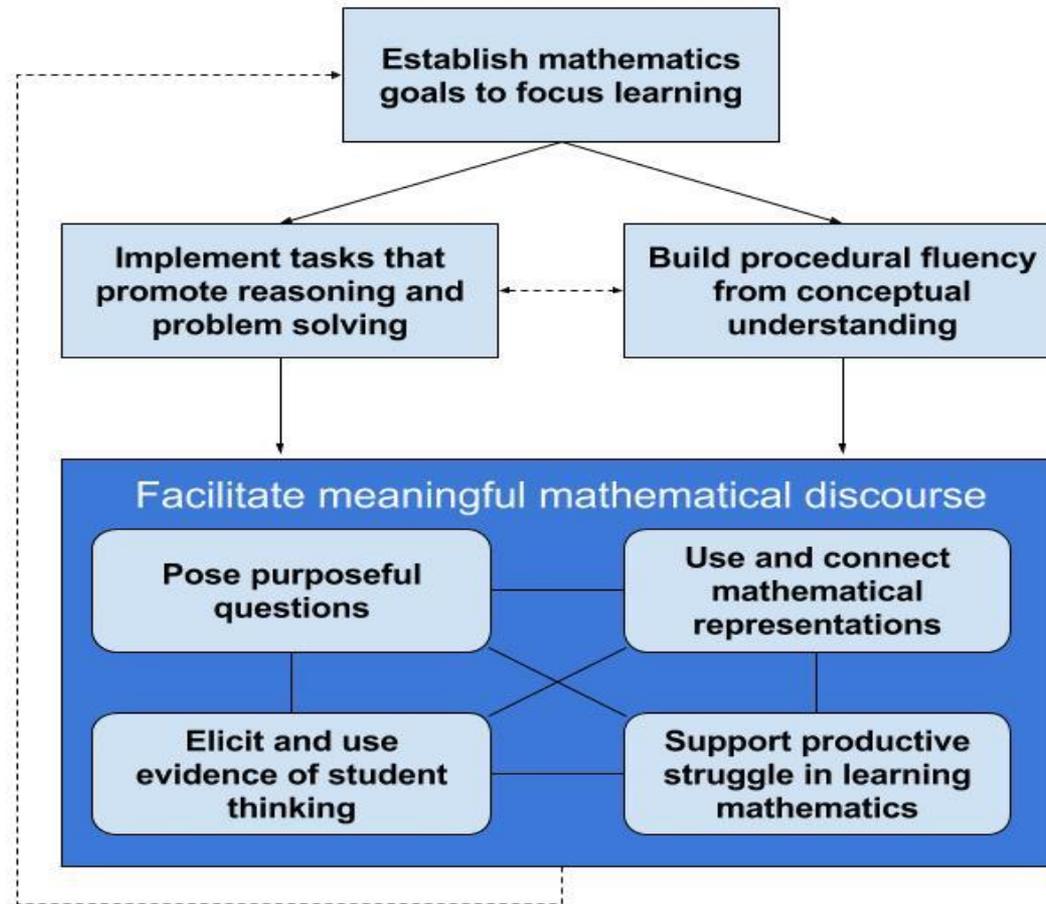


- **Integrating the Mathematics Teaching Practices and the Equity-based Teaching Practices: Taking Action: Implementing Effective Mathematics Teaching Practices** (NCTM) 2017-2018



- **A Fresh Look at Formative Assessment in Mathematics Teaching** (NCTM) 2018-2019

# Effective Mathematics Teaching Practices



# Equity-Based Mathematics Teaching Practices

**Go deep with mathematics.** Develop students' conceptual understanding, procedural fluency, and problem solving and reasoning.

**Leverage multiple mathematical competencies.** Use students' different mathematical strengths as a resource for learning.

**Affirm mathematics learners' identities.** Promote student participation and value different ways of contributing.

**Challenge spaces of marginality.** Embrace student competencies, value multiple mathematical contributions, and position students as sources of expertise.

**Draw on multiple sources of knowledge** (mathematics, language, culture, family). Tap students' knowledge and experiences as resources for mathematical learning.

# Five Practices for Orchestrating Productive Mathematics Discussions

Set Goals and Select Tasks

Anticipate

Anticipate likely student approaches, missteps, and solution paths to mathematical tasks, as well as questions to ask students, prior to teaching the lesson.

Monitor

Monitor and interact to assess and advance learning as students wrestle with the mathematics of the task, working independently or in small groups.

Select

Select particular students or small groups to present and explain their mathematical work and solution paths during the class discussion of the task.

Sequence

Sequence the selected approaches and solution paths in a specific order to focus the class discussion and advance student learning of the mathematics.

Connect

Connect and compare student approaches and solution paths in ways that highlight and relate important mathematical ideas.



## Implementing the Five Practices

What are the some of the instructional challenges you face in your classroom?  
How do the Five Practices help to address those issues?

The first thing that comes to mind is their beliefs in the students. We had a lot of timid teachers at first, and they didn't know if the students were actually capable of the mathematics for their grades. We said, "Give this a try. Try the five practices, see if you can anticipate, and determine how to support the students." Now that they've done that, they see it: "Oh yes, my students are capable." It doesn't matter if it's a student with limited English; we know how to support them because we've anticipated what some of the struggles might be.

*The 5 Practices in Practice: Successfully Orchestrating Mathematics Discussions in Your Elementary Classroom*; Smith, Bill, and Sherin, Corwin Mathematics,, 2019, p. 8

# TEACHING IS POWERFUL

Teaching either reinforces/reproduces or it can avert and disrupt patterns.

## 1. AWARENESS OF PATTERNS

- Becoming critically conscious of common patterns of thinking about “ability”
- Understanding one’s own identity and how that shapes one’s assumptions and interpretations
- Understanding that these patterns are historical and embedded in our institutions and systems

## 2. AVERTING /DISRUPTING PATTERNS

- Consciously NOT following or reproducing the patterns
- Developing specific new habits and practices that counter the patterns
- Strengthening your own mathematical knowledge for teaching

# One District's Reflection on Implementing the 5 Practices

\*video



What resonated with you?

What questions do you have?

# Specifying the Learning Goals

The 5 Practices in Practice, 2019

pp.14-15

Margaret (Peg) Smith

Miriam Gamoran Sherin

“Performance goals indicate what students will be able to do as a result of engaging in the lesson.”

“Learning goals explicitly state what students will understand about mathematics as a result of engaging in a particular lesson.”

Examples:

Targeted Idea	Performance Goal	Learning Goal
<b>Slope</b>	Students will be able to find the slope of a line given two points.	Students will recognize that slope is the ratio of the vertical change to the horizontal change between <i>any</i> two points on the line

## VIDEO



What resonated with you?

How does this distinction  
between learning and  
performance goals  
connect to Phil Daro's  
ideas about  
answer-getting?

# LAUNCH

\*videos



Four aspects to keep in mind when setting up complex tasks to support all student learning:

1. Key Contextual Features of the Task:  
Students understand the context of the problem.
2. Key Mathematical Ideas of the Task:  
Students are able to read and make sense of representations and are able explain what the problem is asking them to find.
3. Development of Common Language:  
Common language is often needed when there is vocabulary used in the task that may not be familiar to some or all students.
4. Maintaining the Cognitive Demand: The cognitive demand is maintained by not suggesting a pathway to follow or giving away too much information.

*The 5 Practices in Practice: Successfully Orchestrating Mathematics Discussions in Your Middle School Classroom;* Smith, Bill, and Sherin, Corwin Mathematics, 2019, p. 33

# Differentiation with the Five Practices

Rather than differentiating instruction by providing different students with different tasks, she selected one task and met the needs of different learners by providing a range of resources for students to consider and questions that would challenge learners at different levels.

# Key Questions that Support the Process of Anticipating Students' Responses (Figure 3.1)

WHAT IT TAKES	KEY QUESTIONS
Getting inside the problem	How do you solve the task?
	How might students approach the task?
	What challenges might students face as they solve the task?
Planning to respond to student thinking	What assessing questions will you ask to draw out student thinking?
	What advancing questions will help you move student thinking forward?
Planning to notice student thinking	What strategies do you want to be on the lookout for as students works on the task?

From *The 5 Practices in Practice: Successfully Orchestrating Mathematics Discussions in Your Middle School Classroom*; Smith, Bill, and Sherin, Corwin Mathematics, 2019, p. 38

# Monitoring Chart

Monitoring Guide		
Mathematics Learning Goal:		
Task:		
How will I Launch the lesson:		
Anticipated Strategies	Assessing Questions	Advancing Questions

Use the Monitoring Chart to anticipate how students might solve the problem. Include incorrect solutions.

# VIDEOS

How does anticipating student thinking and using the monitoring tool support the learning goal?



Dates of MF Meeting	Brief Description of Leadership Work Planned	# of hours outside the contract day	<i>Date of Administrator Meeting with Administrator Initials</i>
January 14th			
February 11th			
March 10th			
June 8th (for educators receiving a stipend; please submit by June 15th)			

LOOKING AHEAD

# LOOKING AHEAD

1. How would you describe the focus of your leadership work as a Math Facilitator to your Admin?
2. Share ideas at your table for what you think the work at your school would look like between now and the next session.