Math Facilitator Meeting

January 14, 2020
Artwork by James Kranklin
Who’s in the Room?

Elementary

Middle

High

Some combination of those

New Math Facilitators

Math Facilitator for 3 years or more

Math Facilitator for 5 years or more
To provide equitable learning opportunities in mathematics for all students PreK - Grade 12 in the Boston Public Schools
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.

*From A Fresh Look at Formative Assessment in Mathematics Teaching, Silver and Mills, NCTM 2018, p.v*
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
Introductions and Overview
Equity and the Five Practices
Looking Back
Setting Goals
Anticipating Student Responses
Our Texts and Journal
Reflect in your journal.

Share your thoughts at your table.

Read the foreword by Dan Meyer.

Why did you become a (math) teacher?
A Brief History of Teacher Leadership Work 2015-2019

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

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

From Taking Action: Implementing Effective Mathematics Teaching Practices, Smith, Huinker, and Bill; Smith, Steele, and Raith; Boston et al., NCTM, 2017
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.

From Taking Action: Implementing Effective Mathematics Teaching Practices, Smith, Huinker, and Bill; Smith, Steele, and Raith; Boston et al., NCTM, 2017
Five Practices for Orchestrating Productive Mathematics Discussions

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.

Adapted from Taking Action: Implementing Effective Mathematics Teaching Practices, K-Grade 5, Huinker and Bill, NCTM, 2017, p.150
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
Match the indicators to:
Low Level Tasks
1. Memorization
2. Procedures Without Connections
OR
High Level Tasks
1. Procedures With Connections
2. Doing Mathematics
What resonated with you?

What questions do you have?
Doing Math Together:

Solve the State Fair and Markers Tasks

1. Solve the State Fair and Markers Tasks

2. Share representations and strategies.

3. What might students learn mathematically from doing each task?
Specifying the Learning Goals

Read pages 14-16 in either the Elementary or Middle School text

Learning and Performance Goals:

Discuss the distinction between learning and performance goals.
What resonated with you?

How does this distinction between learning and performance goals connect to Phil Daro’s ideas about answer-getting?
Focus on student sense-making.

Be specific about what you notice.

Consider alternative interpretations.
Read Analyzing the Work of Teaching on page 31.

After watching the video, write your thoughts in your journal.

Talk in groups of 3 with at least 1 elementary and secondary in each group.
<table>
<thead>
<tr>
<th>Read</th>
<th>Discuss highlights from the section, including the connection between (2) Key Mathematical Ideas of the Task and (4) Maintaining the Cognitive Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launching a Task-Analysis</td>
<td>Pg. 32-33 (Elementary)</td>
</tr>
<tr>
<td>Pg. 31-33 (Middle)</td>
<td></td>
</tr>
</tbody>
</table>
Choose an upcoming lesson.

Determine the learning goal(s).

Plan your launch.

Rehearse your launch in groups of three.

Read and Reflect: Linking the Five Practices to Your Own Instruction (p. 35)
Use your journal to reflect on the morning activities and the practice and ideas posed in Chapter 2.

SUHUPU
Find someone new to discuss your reflection.
LUNCH

When you return from lunch, we will be in grade band groups.
Chapter 3:
Anticipating Student Responses

Solve the State Fair or Markers Problem another way.
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)

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

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

Use the Monitoring Chart to anticipate how students might solve the problem. Include incorrect solutions.
Write several assessing and advancing questions for at least two of the solutions.

Share with another pair or table.

Discuss and provide feedback.

Use State Fair or Markers Task
Read
Figure 3.2  (pg. 41)
Figure 3.4  (Pg. 45-46-Middle) (Pg. 46-48- Elementary)

How does this compare to what you did?

If you have time, note solutions and questions for other problems in this section.
How does anticipating student thinking and using the monitoring tool support the learning goal?
<table>
<thead>
<tr>
<th>Dates of MF Meeting</th>
<th>Brief Description of Leadership Work Planned</th>
<th># of hours outside the contract day</th>
<th>Date of Administrator Meeting with Administrator Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 14th</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February 11th</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 10th</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 8th (for educators receiving a stipend; please submit by June 15th)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.
Linking the Five Practices to Your Own Instruction

Use the task for which you planned the launch, anticipate, get inside the problem, plan to respond and plan to notice student thinking. (Figure 3.1)

Fill out the monitoring chart with a colleague(s) at school and bring to the next session.
Exit Survey

Please complete the exit survey to provide feedback for future planning of our Math Facilitator Meetings and to guide our work with schools this year.

http://bit.ly/MFMeeting_Session1