

**Facilitator Notes – Protocol 3**  
*Essential Understandings About Rigorous Mathematics Instruction*

Time, Format & Materials	PPT Slides	Description	Comments to Facilitator
<p><b>10 min.</b> Whole group</p> <p><i>Facilitators Notes</i></p> <p><i>Provide participants PPT handouts for note-taking</i></p>	<p>2</p> <p>3 - 4</p>	<p><b>Getting Started:</b></p> <ul style="list-style-type: none"> <li>• Review HO 2.2: <i>Summary of the Protocols</i> to set some context for today’s protocol and to briefly talk about how it fits within the set of the 5 protocols.</li> <li>• Go over goals and agenda</li> <li>• Revisit parking lot of questions from last time – any that you want to address during the meeting today? (Don’t have to answer them now, but can flag ones that you hope to discuss/answer during today’s mtg.)</li> </ul>	<p><i>At the start of each meeting, it is helpful to review the flow of the 5 protocols to understand how the current protocol fits within the overall set.</i></p>
<p><b>25 min.</b> Whole group</p> <p><i>(Talking points provided for slides 6-16)</i></p>	<p>5 - 16</p>	<p><b>A First Pass at Defining “Rigorous Mathematics”</b></p> <ul style="list-style-type: none"> <li>• Take 5 min. together to brainstorm what comes to mind when the team hears the phrase “rigorous mathematics.” Chart suggestions on chart paper or on the board.</li> <li>• Have the mathematics representative(s) on your team lead everyone through a brief presentation on slides 5 – 16.</li> <li>• Revisit the brainstormed list and see if there are additions, deletions or changes the team wants to make to the list.</li> </ul>	<p><i>This first part of the session provides an opportunity to begin to brainstorm a definition of “rigorous mathematics experience for all students.” This definition will be firmed up together over the course of the session.</i></p> <p><i>Make sure the mathematics representative(s) has a copy of the ‘Talking Points for PPT Slides’. This handout provides background and guidance on the talking points for the person presenting slides 6 – 16, and goes beyond the notes at the bottom of each slide.</i></p> <p><i>This first set of slides presents an example that highlights what is meant by “going into greater depth” in mathematics.</i></p>

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***During the PPT Presentation:***

*During these slides, some members of the team may express concern that students with disabilities just can't handle these kinds of problems.*

*You can point out that NO student is expected to handle these kinds of problems without first having some prior mathematics experiences that give them the skills and tools they need to think and reason about these problems. Even though this problem may be non-routine, students with disabilities can – and should – be given an opportunity to think about the mathematical ideas in the problem. It's important to remember that not all disabilities interfere with a student's ability to reason. If this discussion comes up here, you might want to revisit the beliefs statements from Protocol 1.*

*You can also point out that Protocols 4 & 5 will get into a framework for helping support students to be able to do more rigorous mathematics work. The focus for today's protocol is **not** to get into how to do this in the classroom, but to first come to some shared understanding of what is meant by "rigorous mathematics for all students."*

*Some members of the team may also express the belief that you can't get into learning about concepts or doing "applied" problems until students have mastered procedures. You may want to compare this idea to giving students exposure only to studying grammar and to diagramming sentences, and never letting them read a book for meaning until they can diagram a sentence.*

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<p style="text-align: center;"><b>25 min.</b></p> <p>Whole group</p> <p style="text-align: center;">(Talking points provided for presenting)</p>	<p>17 - 21</p>	<p><b>A Brief Introduction to the Standards for Mathematical Practices (SMP)</b></p> <ul style="list-style-type: none"> <li>• The mathematics representative(s) on your team continues with a brief presentation on slides 17 - 21 to introduce the 8 Standards for Mathematical Practices.</li> <li>• Distribute HO 3.2: <i>Math Practices Summary Sheet</i>. (If team members did not already receive</li> </ul>	<p><i>This section of the protocol provides a brief introduction to all members of the team to the MA Content Standards and the Standards for Mathematical Practice in the new MA Curriculum Framework and together they represent a rigorous math program. These eight "math practices" are a vital component to implementing the new standards effectively.</i></p> <p><i>Please show the members of the leadership team where</i></p>

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slides 17-21.)  HO 3.1 HO 3.2		HO 3.1 prior to the meeting, distribute that now as well).  <ul style="list-style-type: none"> <li>Provide a few minutes for the mathematics representative(s) on the team to answer any questions that the team has about the practices, and to discuss some of the examples provided in the right-hand column of HO 3.2.</li> </ul>	<p><i>the Standards for Mathematical Practice can be found in the frameworks and where the content standards can be found.</i></p> <p><i>The Summary Sheet provides a quick summary of the eight practices that team members read about from HO 3.1, distributed before the meeting. Unlike HO 3.1, it provides a few examples of each practice in the right-most column.</i></p> <p><i>NOTE: It’s important for team members to become familiar with BOTH the full text of the math practice (HO 3.1) and the summary with examples (HO 3.2).</i></p>
	22	<ul style="list-style-type: none"> <li>Take a few minutes to gather some initial thoughts from the team about the question: <i>How do these math practices combined with math content fit or not fit with your own ideas of “mathematical rigor?”</i></li> </ul>	<p><i>Note that throughout this protocol, team members are given different opportunities to discuss “mathematical rigor” as a way to develop some thoughts about what this phrase means for the team. The team will generate a shared definition at the end of the protocol, so it is expected that there will not yet be an agreed-upon definition among the team to work from yet.</i></p>
45 min. Whole group		<p><b>Using Video to Illustrate Math Practice #3</b></p> <ul style="list-style-type: none"> <li>All team members now review all three columns for MP #3: <i>Construct viable arguments and critique the reasoning of others.</i> The mathematics representative(s) on the team can provide further example or explanation as needed.</li> </ul>	<p><i>This section of the protocol uses a video example to help the team think more about the relationship between the standards for mathematical practice and rigorous mathematics. MP #3 is used as a sample math practice with the video. 7.EE.4 is the content standard that is addressed.</i></p>

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<p>HO 3.3 Graph paper Color tiles</p>	23	<ul style="list-style-type: none"> <li>Distribute HO 3.3: <i>Staircase Problem</i>.</li> <li>Give team members 5-7 min. to begin work on this math problem that is featured in the video. Make available the graph paper, color tiles and any other manipulatives you wish to supply.</li> </ul>	<p><i>Since some of the leadership team members may not be comfortable working on a math problem, only a short amount of time is devoted to this. <b>What is most important is for each team member to engage with the problem enough to be able to follow the students' questions and comments in the subsequent video – it is not necessary to finish it.</b> Emphasize that it is fine for people to just get started and share some initial ideas.</i></p>
	24	<ul style="list-style-type: none"> <li>Review the Content Standard being addressed with the group</li> </ul>	<p><i>When reviewing the video, participants will want to have both the practice and content standard in mind.</i></p>
	25	<ul style="list-style-type: none"> <li>Review the guiding questions for watching the video: <i>What evidence of MP #3 do you see as the students work on the problem in the video?</i></li> </ul>	<p><i>Remind team members of basic guidelines for viewing and discussing video together:</i></p> <ul style="list-style-type: none"> <li><i>to base any suppositions about the video on evidence from the video – be prepared to describe what you saw in the video that leads you to your conclusion;</i></li> <li><i>to talk about the teacher in the video respectfully, as if he or she was there in the room with you.</i></li> </ul>
Video clip	26	<ul style="list-style-type: none"> <li>Watch the video clip “Staircase Problem” together, looking for evidence of MP #3.</li> <li>After viewing, ask team members to offer 2-3 examples of evidence that they think they saw of MP #3, and discuss: <i>What evidence from the video did you see that you think embodies MP #3?</i></li> </ul>	
Individually		<ul style="list-style-type: none"> <li>Give everyone a few minutes to think and write</li> </ul>	

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	27	<p>individually in response to the prompt:  <i>Based on what you're thinking at this point, what are three things that now seem central to you about "rigorous mathematics?"</i></p> <ul style="list-style-type: none"> <li>Revisit the brainstormed list about what constitutes rigorous mathematics, and see if there are additions, deletions or changes the team wants to make to the list.</li> </ul>	
Time, Format & Materials	PPT Slides	Description	Comments to Facilitator
<p><b>15 min.</b>                      Whole group</p>	<p>27</p> <p>28</p>	<p><b>Wrap Up</b></p> <ul style="list-style-type: none"> <li>Summarize and list any outstanding questions that have not been answered yet and that are still under discussion.</li> <li>Review parking lot questions and how to handle them. Will they be addressed outside these meetings, or in a subsequent meeting?</li> <li>If there are any tasks to be done before the next meeting, review what those tasks are, who will take the lead on the task and when will the individual(s) attend to the task.</li> <li>Review the purpose of next meeting.</li> <li>Clarify date, time and location of next meeting.</li> </ul>	

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#### **Resources**

*The following resources informed the development of this session and can be used to extend this work:*

- Massachusetts Department of Elementary and Secondary Education. (2011). Massachusetts Curriculum Frameworks in Mathematics (ESE Website)
- FREE Summer PD: Professional Development Institutes (PDIs) (ESE Website)
- Explorations of the 2011 Math Frameworks (ESE Website)
- Tools for the Common Core Standards <http://commoncoretools.me/tools/>