

5 Practices for Orchestrating Productive Mathematics Discussions

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Part Two – Anticipating & Monitoring

As we turn the corner on the current school year, we are excited to bring you Part Two of the Three-Part Series centered on “5 Practices for Orchestrating Productive Mathematics Discussions” by Margaret S. Smith and Mary Kay Klein. Part One ([found here](#)) brings to light the importance of setting a clear and measurable goal that contains a mathematical task worth solving. There is even a helpful tool I recommend using to identify a quality task.

Part Two builds off the foundation of the learning goal and helps us understand ways in which to bring it to life in the classroom. Of the 5 Practices, which include *anticipating, monitoring, selecting, sequencing, and connecting*, this article centers on the first two practices – anticipating and monitoring. These practices don’t necessarily bring the flash, pizzazz, or excitement as the other practices, yet I have found in working with multiple districts (K-12) they give teachers the best chance for success. In short, without considering what students will say and do you are left in a position of being reactive instead of proactive. Taking time to anticipate strategies and formulate questions to clarify or make thinking visible prepares for stronger execution once the lesson has begun.

The first practice (**anticipating**) places the teacher in the mindset of a wonderer. How might students approach this problem? What might they do first? What correct or incorrect pathways might they pursue? Once you ask yourself these questions you are primed to capture our own thinking. You dig deep into your inner mathematician and explore how many ways you can solve the task. What tools might be helpful? Which representations could be used for this task? Come up with as many pathways as possible ... and then go across the hall and ask your colleague how they might solve it. The purpose here is to not be caught off-guard when students solve the task in the classroom (although it will inevitable happen – they are just too creative!). After you and your colleagues have exhausted all options pause and consider which pathway might best help students achieve the day’s learning goal. This approach will be surfaced later in the lesson once you ask students to share their thinking with the whole group.

Now that you are prepared for what might come, you need to think about how you will respond to the work students have produced. Asking questions to clarify or

explore thinking is important. Examples include: “What did you do first?” or “Can you tell me where _____ (point to student work) came from?” or “How might that help you get closer to an answer?” could be considered. Additionally, questioning aligned to the learning goal is also important. This may sound like “I see you used _____ to solve the problem. How might that relate to today’s goal of _____?” or “What connections are you making between your work and our goal of _____? By leveraging your experience in the classroom of knowing where students may need support allows you to prepare questions for overcoming these hurdles. Preparing them ahead of time allows you to be more effective and not default to walking students through the steps to find the right answer. The ownership still lies with them.

Once equipped with the strategies that may surface during the lesson it’s time to **monitor** what students are actually doing, saying, and using. In a face-to-face classroom you likely will be walking around the room asking the questions you’ve prepared and taking note of who is using which strategy. In a virtual setting extra attention should be given to where and how students will make their thinking visible.

Many teachers are finding success by using digital tools such as Google’s [Jamboard](#), [Padlet](#) or [Desmos](#). The format used in the image to the right has proven to help teachers capture the anticipated strategies, who is using them and what order they should be shared with the group (the goal of the lesson helps suggest which order). Some teachers appreciate

Strategy	Who and What	Order
<p>Unit rate Find the number of leaves eaten by one caterpillar (2.5) and multiply by 12 or add the amount for one 12 times</p>	<p>Janine – multiplied 12×2.5 (sticks representing caterpillars) Kyra – added 2.5 12 times (picture of leaves and caterpillars)</p>	
<p>Scale Factor Find that the number of caterpillars (12) is 6 times the original amount (2), so the number of leaves (30) must be 6 times the original amount (5)</p>	<p>Jason – narrative description</p>	
<p>Scaling Up Increasing the number of leaves and caterpillars by continuing to add 5 to the leaves and 2 to the caterpillars, until you reach the desired number of caterpillars</p>	<p>Jamal – table with leaves and caterpillars increasing in increments of 2 and 5</p>	
<p>Additive Find that the number of caterpillars has increased by 10 ($2 + 10 = 12$), so the number of leaves must also increase by 10 ($5 + 10 = 15$)</p>	<p>Missy and Kate</p>	
<p>Other Scaling up by collecting sets of 2 leaves and 5 caterpillars</p>	<p>Martin (picture) Melissa (table)</p>	

adding another column to record the questions they have prepared as well.

Now that you have a solid foundation about goal setting and task selection from Part One and ways in which to *anticipate* and *monitor* student work from this article it is time to practice these skills. I suggest taking 5-10 minutes to capture what strategies students may use during your next lesson and think about how you will move them closer to the learning goal. Write these down, use them in class, reflect on ways to improve. Have fun and take time to appreciate the young people you have the opportunity to work with every day.