# Virginia Department of Education

## 2019 Developing Deeper Learning through Rich Mathematical Tasks – Mathematics Institute

# Facilitator’s Guide – Grade Band 3-5

## 2019 Mathematics Institutes

*Project Purpose:* The purpose of the 2019 Developing Deeper Learning through Rich Mathematical Tasks – Mathematics Institute is to provide teachers and mathematics leaders with professional development focused on effective mathematics instruction.  Particular emphasis will be on the implementation of rich mathematical tasks to support deeper learning opportunities for students and to strengthen locally-designed curricula.

Specific goals of the Institute will include:

* strengthening the teaching and learning of mathematics through the use of rich tasks;
* supporting equitable learning opportunities and promoting positive mathematical identities and agency; and
* providing training materials for divisions and teachers for use as a local professional development tool.

## Professional Development Instructions

A product of the 2019 Mathematics Institutes is a set of online professional development modules designed to be used by a group of teachers of a specific grade level or course, facilitated by a member of the team. Modifications could be made to adapt the professional development for more than one grade level/course or for large groups. Facilitators should review the activities and handouts in this guide prior to facilitating this professional development.

| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
|  | **Overarching Session Learning Intentions****Content:**  I am learning about strategies and approaches that make teaching and learning more visible.**Language:**  I am learning to use the language of a visible learning mathematics classroom. **Social:**  I am learning how to listen and respond to my colleagues’ ideas in ways that move everyone forward as learners. | * Chart paper
* Learning Intentions Poster
 |
| **20 minutes** 1. Welcome and Introduction

(5 min.)1. Setting the Purpose

(15 min.) | 1. **Welcome and Introductions**
* (Slide 5) Welcome participants and introduce facilitators
* (Slides 6-13) Getting to know them Activity: “Just like me” Read each statement and instruct participants to “Stand if this refers to you” and say “Just like me!”
1. **Setting the Purpose**
* (Slide 14) Share agenda for the day (overview as it is gone over in depth in video)
* (Slide 15) Opening VDOE Video
	+ Explain that VDOE has prepared a video to help set the stage for our work today.
	+ Pass out books during video.
* Share special information such as location of restroom, lunch time (12 – 12:45), parking lot, bit.ly for access to presentation will be available at the end, materials are on table but please do not look ahead.
 | * [Grade band 3-5 Power Point](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/2019-3-5-institute.pptx)
* VDOE Video Introduction (13 mins)
* Parking Lot Poster
* [Poster of learning intentions for the day](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/1-learning-intentions.docx)
* Sticky Notes
 |
|  | * (Slide 16) Share Learning Intentions for the day: Explain that dividing learning intentions into content, language, and social varieties can provide teachers and students alike a clearer sense of the day’s expectations.”
	+ **Content learning intention**: What is the math I am supposed to use and learn today?
	+ **Language learning intention**: How should I communicate my mathematical thinking today?
	+ **Social learning intention**: How should I interact with my learning community today?
* Read the overarching learning intentions for the day (point out the poster on the wall). These learning intentions are for the entire day – much like you would set learning intentions for a unit. During each Module today, we have set success criteria so that you can gauge your own progress towards the module’s specific learning intentions.
 |  |
|  | **Module I: Overview – Visible Learning, Equity, and Identity****Success Criteria:*** I can recognize and support equitable learning opportunities for all students that promote positive student mathematical identity and agency.
* I can describe how to create a classroom environment that supports the development of assessment-capable mathematics learners.
* I can recognize strategies in teaching and learning that have high impacts (effect size) on student achievement.
 |  |
| **75 minutes w/10 min break**1. Success Criteria

(2 min.)1. Math Identity, Agency and Equity

(13 min.) | 1. **Success Criteria for this module**
* (Slide 18) Share success criteria for this module
* Connect to the eight mathematical practices and teacher clarity. Explain:
	+ While learning intentions define the content, language, or social skills that students will use during a given lesson, the success criteria are written so that students can evaluate their own progress towards the learning intentions.
	+ Teachers should ask themselves-What evidence shows that students have mastered the learning intention(s)? What criteria will I use?
 | * Grade Band 3-5 Session PowerPoint
 |
| 1. Definitions

(5 mins)1. Quotes

(15 min.)1. Assessment Capable Learners

(15 min.)1. Effect Size Card Sort

(15 min.)1. Wrap Up

(10 min.) | 1. **Math Identity, Agency and Equity**
* (Slide 19) As we begin to think about creating an equitable environment for teaching and learning math, we will begin by considering our own experiences as a student in the math classroom.
* (Slide 20) Pass out the Math Identity graph (Allison pass out)
* (Slide 21) Explain that they will complete the graph by answering the following questions:
	+ Briefly describe one of *your low points*. What made this a negative mathematical experience?
	+ Briefly describe one of *your high points*. What made this a positive mathematical experience?
	+ *After 5 minutes*, ask participants to share their math story with someone at their table.
	+ What is the leverage point for a mathematical experience to be positive or negative?
	+ Thinking about your classroom, what beliefs do you hold that promote positive mathematical experiences for students?
	+ *Summarize the activity* by emphasizing that experiences make a difference; people make a difference. We all need to recognize that each of us has a tremendous impact on how students view themselves as mathematicians.
1. **Definitions of Math identify and agency**
* (Slide 22) Share definitions of Math Identity and Agency
	+ What do you believe fosters a positive math identity or a strong sense of math agency? (Accept a few answers from participants)
	+ Explain that your math experiences impact your math identity and agency, which in turn shapes your math mindframe.
	+ Mindframes are ways of thinking about teaching and learning. The mindframes each teacher possesses has a major impact on their students learning.
* (Slide 23) Research suggests that we teach the way we were taught. Our past experiences learning math have shaped the way we teach mathematics. Regardless, we want our students to have a positive math identity. We want them to be empowered and see themselves as doers of math. We want them to be in a classroom that encourages students to be:
* Are active participants
* Engage in reasoning and sense making;
* Strive to make their thinking visible and intelligible to others;
* Use multiple forms of discourse; and
* Critique their world through using mathematics.
1. **Quotes**
* (Slide 24) Read Quote. This statement appears as the preface to all the Virginia Standards of Learning documents at every grade level. State that during last year’s institute considerable time was spent describing equitable teaching practices. This year we will also connect to these because equitable classroom experiences can positively impact students’ math identities. (2 mins)
* (Slide 25) Have participants read the equity quotes (handout already on table). Ask “Which quote resonates most with you?” Go to the corner numbered the same as the quote on the handout. When they get their corner, discuss with a partner why they chose that quote. (3 mins)
* (Slide 26) Corners matching quotes. Allow 5 minutes to talk with a partner. (5 mins)
* After 5 minutes, ask a few volunteers to share with the whole group about their discussions they had with their partner. (3 mins)
* (Slide 27) Researchers have identified five equity-based mathematics teaching practices:
	+ Go deep with mathematics
	+ Leverage multiple mathematical competencies
	+ Affirm mathematics learners’ identities
	+ Challenge spaces of marginality
	+ Draw on multiple resources of knowledge
* You may have noticed these practices were evident within the quotes and discussions you just had. (2 mins)
1. **Assessment Capable Learners and the Visible Classroom**
* (Slide 28) State that equitable learning experiences are a large part of a visible learning classroom. Visible learning in the mathematics classroom occurs when teachers see learning through the eyes of their students and students see themselves as their own teachers. So we are going to think about what this looks like and sounds like in the classroom. Invite participants brainstorm ideas about visible teaching and visible learning at their tables. Popcorn share some ideas from their list.
* (Slide 29) Participants will compare their list to Slide 29. Turn and Talk about the similarities and differences. Refer them to page 24.
* “Teaching mathematics in the visible learning classroom builds and supports assessment-capable visible learners.” As part of the resources provided, there are videos and online resources available.
* (Slide 30) While watching the video, think about these two questions:
	+ What are characteristics of an assessment-capable learner?
	+ Can you describe how to create a classroom environment that supports the development of assessment-capable mathematics learner?
	+ Play the Assessment Capable Learners video by clicking on the picture of the book. [Video 2: Creating Assessment-Capable Visible Learners](https://resources.corwin.com/vlmathematics-3-5) – Stop at 3:24.
	+ Turn and Talk to reflect on the video and questions. Share out as a whole group.
* (Slide 31) Share what Assessment-Capable Visible learners can do by displaying the blue map; also located on page 14 in the book.
* (Slide 32) In creating an assessment-capable visible learner, it is important to be intentional with the strategies used within the classroom. Using effect sizes from Hattie’s work, teachers can be intentional in choosing high leverage strategies while planning their instruction. As practitioners, we must identify what works best within instruction, in order to implement the most effective strategies with high levels of fidelity. Display the barometer of influence and remind them that 0.4 means that this effective enough to create at least one year’s growth in students. Refer participants to inside cover and use descriptions on slide to briefly describe each section of the barometer.
1. **Effect Size Sort**
* (Slide 33) Explain that we will now visit the Desmos website to complete an [Effect Size Sorting activity](https://teacher.desmos.com/activitybuilder/custom/5cffc3e35a559b0bfa5173d5/edit). Allow time for participants to pull out a device (preferably a tablet or laptop. Participants can look on with one another – ideally one device for each pair. Click on “create class code” and display code for participants to login at [Desmos](http://www.student.desmos.com/). Click on “View Dashboard”. Click the pacing icon and select slides 1-3 in order to disable the activity at this point. (15 minutes)
* Explain that we will revisit this activity at the end of the day after we have given experiences with these strategies throughout the day.
* (Slide 34) For the rest of the presentation, the Barometer arrows on the slides will highlight the high leverage strategies, and effect sizes, that have been incorporated in the presentation. Display the strategies that have been used so far since the beginning of this presentation

**Comparison of Institutes** * (Slide 35) The 2018 Mathematics Institutes focused on facilitating meaningful mathematical discourse. (the purple sections highlighted in the graphic) - Whereas this year the emphasis will be on establishing goals to focus learning, implementing tasks that help build procedural fluency from conceptual understanding. These things happen in a Visible Learning classroom, filled with assessment capable learners who have strong math identities and agency. (show location of boxes on graphic)
* (Slide 36) Remind participants that these all occur in equitable mathematics classrooms where the process goals are valued and used.
1. **Revisit Success Criteria and Reflection**
* (Slide 37) Pass out 2019 Reflection document and invite participants to review the Success Criteria for Module 1.
* It is okay not to have this mastered yet-we will be coming back to these ideas all day. Complete the Square, Circle Triangle Reflection sheet.
* Allow 4 minutes to complete. Allow 2 minutes to share at your table and 2 minutes for a few people to share aloud whole group.
 | * [Math Identity Graph handout](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/2a-math-identity-elem.docx)
* [Equity quotes handout](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/2b-equity-quotes-handout.docx)
* Large post-it note for letters (A, B, C, D) for corners
* [Effect Size Card Sort](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/2c-effect-size-card-sort.docx) (2 sets per table)
* [2019 Reflection document](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/3-reflection-document-3-5.docx)
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| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **105 minutes TOTAL**(10 minute break included) | **Module II: Task Implementation (Before)****Success Criteria:*** I can identify how teacher clarity about learning intentions and success criteria contributes to student success.
* I can identify strategies, methods or approaches to meet the learning needs of individual students.
* I can distinguish between tasks that will engage students in higher levels of cognitive demand versus lower levels of cognitive demand.
* I can describe the factors associated with the decline or maintenance of the cognitive level of a rich mathematical task.
* I can anticipate student solution strategies and misconceptions associated with the implementation of a mathematical task.
 |  |
| 1. Introduction

(5 min.) 1. Color Run Task (30 min.)
2. Selecting a Task (5 min.)
3. Cognitive Demand (15 min.)
4. Cognitive Demand of Color Run

 (10 min.)1. Anticipating Strategies

(20 min.)1. Surface, Deep, Transfer

(5 min.)1. Closure (5 min.)
 | 1. **Task Implementation (Before)**
* (Slide 39) Revisit the Teaching Framework for Mathematics. The practice that we will focus on in this module is- “Implementing tasks that promote reasoning and problem solving”.
* (Slide 40) Read the Success Criteria for Module 2 (also located on page 2 of the reflection guide) and revisit the learning intentions for the institute (see Poster on wall)-
* *Content Learning Intention*: I am learning about strategies and approaches that make teaching and learning more visible.
* *Language Learning Intention*: I am learning to use the language of a visible learning mathematics classroom.
* *Social* *Learning Intention*: I am learning how to listen and respond to my peers’ ideas in ways that move everyone forward as learners. (Slide 40)
* Remind the participants of the effect size of for sharing learning intentions and success criteria 1.13.
1. **Color Run Task**
* (Slide 41) Present participants with the Color Run Task.
* Have participants take a few minutes to solve the task in at least two different ways (15 minutes). Ask them to consider strategies that students might use.
* Encourage participants to draw pictures or representations of their strategies.
* Have participants do a Gallery Walk to see other people’s strategies.
* (Slide 42) Turn and Talk: What might be the Learning Intentions for this task? Remind participants of the definitions of the different learning intentions. As we think about a students’ journey towards mastery of content, we first set clear learning intentions.
* (Slide 43) Next, invite teachers to read pages 67-68 in the book that outline the planning for this task, including the learning intentions. Use the structure “Say Something” in which participants determine stopping points within the reading. At each stopping point, participates turn and “say something” brief about what they have read.
* Tell participants that we will be revisiting the task later in the presentation but that we will set it aside for now.
1. **Selecting a Task**
* (Slides 44) Once learning intentions have been clearly identified, we now select a task to meet these intentions.
* (Slide 45) How do the tasks students engage in impact learning?
* (Slide 46) We know that *Student learning is greatest in classrooms where the tasks consistently encourage high‐ level student thinking and reasoning and least in classrooms where the tasks are routinely procedural in nature* and that not all tasks provide the same opportunity for student thinking. So how do we ensure that students are provided opportunities to engage with tasks that require high cognitive demand?
1. **Cognitive Demand**
* (Slide 47) Let’s examine some tasks and decide whether they require high or low cognitive demand. Pass out the Elementary Task sort. Take some time, individually, to decide the cognitive demand level and then share with someone at your table.
* (Slide 48) Pair Square - Have participants find a partner from another table and then pair square with another group.
* (Slide 49) Based on how you decided which task required high or low cognitive demand, create a list of criteria on the back of the document.
* (Slides 50) Share the definition of rich math tasks.
* (Slide 51) Share the characteristics of rich tasks.
* How do these compare to your list of criteria from before?
* How are they alike? How are they different?
* Effect size for identifying similarities and differences 1.32
1. **Cognitive Demand of Color Run Task**
* (Slide 52) Revisit the Color Run Task. Based on the criteria the teams created, does the task require high cognitive demand? Why or why not? Share out.
* (Slide 53) It’s not just about the task. Implementation of the task is very important. A task requiring a high level of cognitive demand may have been chosen; however, implementation of the task will determine whether the level of the task is maintained. High results require both a high cognitive demand task and high levels of implementation.
* (Slide 54) Read Slide 54 and turn and talk to your table group around the factors associated with the decline and maintenance of high level tasks. Talk through some key points such as “telling” students how to solve the problem, doing a similar problem with different numbers first (routinized); not being planned to ask high level questions to get students to think deeply about the content of the task; lack of productive struggle, etc.)
1. **Anticipating student strategies**
* (slide 55) After selecting a task, it’s important for teacher teams to anticipate student strategies by doing the math together.  Through this process, teacher teams can also intentionally plan high level questions and a strong launch in order to keep the cognitive level of the task high.
* (Slide 56) One way to ensure your implementation is high is by Activating prior knowledge. Let’s return to the Color Run Task. Invite participants to read from Chapter 2 to see what the teacher did to plan for this task. (pages 69-75).
* (Slide 57) Reflection on the reading: What are some teaching take-aways you might consider when planning/launching your task?
* (Slide 58) Selecting the task – “The Goldilocks Challenge”. Teachers have to implement tasks that provide students opportunities to progress through these stages, as well as return to different phases if needed. “When students experience a ‘Goldilocks’ challenge, the effect size is 0.74. A Goldilocks challenge is not too hard and not too boring.” (page 37)
1. **Surface, deep, and transfer learning**
* (Slide 59) - (see page 28) High-Impact approaches at each phase. Ongoing assessments inform teachers that students are in various places along this path, and sometimes will move interchangeably between these phases of learning. It is the teacher’s goal to provide interventions and strategies students need at the right time for the right reason.
* (Slide 60) In order to move students through surface, deep to transfer learning, intentional planning is essential. Before implementing the task with students, teachers need to:
	+ Establish learning intentions
	+ Select the task
	+ Do the math/Anticipate solutions
	+ Plan advancing/assessing questions
1. **Closure**
* (Slide 61) Complete the 3-2-1 on the 2019 Reflection sheet. Allow 4 minutes to complete. Allow 2 minutes to share at your table and 2 minutes for a few people to share aloud whole group.
 | * [Color Run Task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/4a-color-run-task.pdf)
* [Elementary Mathematics Cognitive Demand Task Sort Document](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/4b-elementary-task-sort.docx)
* Reflection sheet (continued from previous modules)
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| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **75 minutes TOTAL** | **Module III: Task Implementation (During/After)****Success Criteria:*** I can implement a rich mathematical task to support deeper learning for all students.
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| 1. Community Builder (10 min.)
2. Task Implementation During/After

(5 min.)1. Task Presentation (35 min.)
2. Reflection

(10 min.)1. Scavenger Hunt

(10 min.)1. Closure

(5 min.) | **Open Middle Lunch Task** * (Slide 63) During the lunch break, participants will be invited to explore an Open Middle Task.
1. **Community Builder**
* (Slide 64) Returning from lunch at 12:45, participants take turns rolling a regular dot cube and answer the questions with their table group.
1. **Task Implementation (During/After)**
* (Slide 66) Revisit the Teaching Framework for Mathematics. The practice that we will focus on in this module is in blue- Implement tasks that promote reasoning and problem solving.
* (Slide 67) Share the success criteria for this module.
* (Slide 68) Throughout our morning we began this process of implementing a rich task. We determined Learning Intentions, selected a rich task based off the learning intentions and did the math to anticipate strategies. Now we are going to model how to monitor, select, sequence and connect strategies in order to maintain the level of high cognitive demand.
* (Slide 69) In the previous modules we explored what it meant to facilitate visible learning and how to evaluate and select a rich mathematical task that, if implemented with fidelity, will engage all students in high levels of mathematics that promotes procedural fluency through conceptual understanding. In this module, participants are going to have the opportunity to engage in a rich task. During this time participants will be wearing three hats, if you will, not only as a teacher, but as a task evaluator and as a student engaged in the learning.
* (Slide 70) Impact of Visible Teaching. With the teacher hat on, participants will be watching and listening for the teaching moves that make the learning visible for students engaging in the task. Review the Impact of Visible Teaching graphic.
* (Slide 71) Review the characteristics of a rich task – keeping these in mind as participants with their task evaluator hat on experience the task.
* (Slide 72) Participants will also be immersed in the role of an assessment-capable visible learner as they engage in the mathematics as a student. Revisit those attributes so that you can be mindful of what it looks like and sounds like to be fully aware of the learning intentions of a task, taking learning to the next level, and reflecting on progress towards goals.
1. **Task Presentation**
* (Slide 73) Launch the task by inviting participants to put on their “Student Hat” and notice and wonder about bus schedule. Have participants “Turn and Talk” to discuss what they notice. Record ideas on chart paper and highlight key ideas or vocabulary. (10 min.)
* (Slide 74) Today our learning intention is to apply a strategy for determining elapsed time and the success criteria will show us whether we have met our goal.
* (Slide 75) Allow participants to read task. Then read the task to the participants. “Turn and Talk” to restate what the task is asking without giving any answers. Possible student response: “We need to figure out which Bus Trip, Bus A or Bus B would be better and tell why.”
* (Slide 76) Doing the Math: Allow participants individual think time to begin solving task. After a few minutes, tell participants to share with a partner where they are in their current thinking. You may borrow a strategy from a friend. While participants are working on the task, facilitators are monitoring, selecting and sequencing specific strategies to share. Refer to the anticipation guide to prepare for possible strategies students may use. (15 min.)
* (Slide 77) Task Share: Choose the first person to share their strategy by inviting them to chart their strategy and model their thinking. Use anticipation guide to prepare for specific assessing and advancing questions you will ask the participants to think deeply about the strategy and make connections between strategies. Continue with the sequence of strategies you have chosen and ask purposeful questions to move students’ thinking to more sophisticated strategies. (10 min.)
* (Slide 78) Take a sticky note and put your initials on it. When you’re ready, place your sticky note on the target. The green circle in the middle means “I’ve got it!”, yellow means “I need more time” and the red means “I am stuck, I don’t understand”.
1. **Reflection**
* (Slide 79) Invite participants at each table to select a colored tile (green, red, or blue) and create a trio with others from around the room representing the 3 perspectives. Using the following questions, each trio reflects on the task implementation from their designated perspective.
* (Slide 80)
* Student (green) – How did this task engage the student as an assessment capable learner?
* Teacher (red) – What teacher moves were evident to promote visible learning?
* Task Evaluator (blue) – What characteristics of a rich mathematical task were evident?
* (Slide 81) Invite participants to come back together and share out highlights from their discussions. What are some of their takeaways from the task implementation?
1. **Rich Mathematical Task Template Scavenger Hunt**
* (Slide 82) Pass out the task template.
* (Slide 83) Participants will work with a partner at their table to review the task template and locate the specific components of the resource, as highlighted in the scavenger hunt list.
* (Slide 84) What do you find most useful about this resource?
1. **Closure**
* (Slide 85) Refer to the 2019 reflection document. Review the learning intentions for the day – 3 W’s reflection.
	+ What did you learn?
	+ Why is this useful or important?
	+ How does this support you with implementing tasks?
 | * Dice
* Sticky notes
* Targets (one per table)
* Colored tiles (green, red, and blue)
* [Bus A or Bus B Success Criteria Poster](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/5b-bus-task-success-crit.docx)
* [Bus A or Bus B Task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/5a-bus-a-bus-b-task.docx)
* [Task template –Bus A or Bus B](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/5c-bus-task-template.docx)
* Reflection sheet (continued from previous modules)
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| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **65 minutes TOTAL** | **Module IV: Assessing Student Understanding****Success Criteria:*** I can use success criteria to provide effective feedback to students to deepen student learning.
* I can use a rubric to score student work samples and work collaboratively to calibrate my scores.
* I can analyze student work to identify what students know and are able to do in order to plan instruction that moves all students forward as learners.
 |  |
| 1. Success Criteria

(2 min.)1. Scoring and Calibration Protocol(8 min.)
2. Preparing Student Work(5 min.)
3. Sorting and Scoring(15 min.)
4. Discussing work (10 min.)
5. Effective Feedback

(15 min.)1. Rationales

(5 min.)1. Closing

(5 min.) | 1. **Success Criteria**
* (Slide 87) Share the Success Criteria for this module.
1. **Scoring and Calibration: Bus - Elapsed Time Task**
* (Slide 88) Soon we will begin scoring the student work for the Elapsed Time task using a calibration protocol.
* The purpose of this protocol is to
* Ensure equity in how each scorer’s contributions are considered
* Provide a structure that makes it safe to question each other
* Make the most out of the time
* Provide for fair and consistent scoring
* (Slide 89)Calibration protocol– discuss that having a protocol provides a process whereby groups can discuss student work in order to reach consensus about how to score the work based on a rubric or scoring criteria.
* Use the calibration protocol handout to discuss the steps in scoring student work
	+ - Examination – work through task (individual)
		- Discussion of proficient responses (small group)
		- Read and place in groups (individual)
		- Score student work (Individual)
		- Discussion (small group)
		- Debrief discussion (small group)
1. **Preparing to score student work**
* (Slides 90) Since the participants have already worked on the task (step 1), have them discuss what a Proficient score looks like for each of the process goals (specific to this task). Have participants utilize the Rich Mathematical Task Rubric as a guide.
* (Slide 91) Revisit the mathematics process goals - Discuss the connections between the process goals and the mathematics practices listed along the side of the rubric (e.g., Facilitating Discourse).
1. **Sorting and scoring student work**
* (Slide 92) Provide a copy of the student work to each participant. Participants will need to cut out the work (students E and F have 2 pages). Then have the participants review and sort the student work into three groups (individually) – low, medium, and high based on overall impression. Once individuals have created their low, medium, and high groups, they should individually.
* (Slide 93) Score each student’s work sample using the rubric (individually).
* Record their scores on the individual scoring notes sheet.
* Record evidence from the student work (aligned to the rubric) to support the score given.
1. **Sharing and discussing student work** (collaboratively)
* (Slide 94) Score sharing without explanation – one at a time, team members share their score for each of the rubric criteria while a recorder completes the group’s score sheet. (An extra copy of the Individual Score Sheet may be used).
* (Slide 95) Discussion –Use evidence from the work and the rubric to support the scores.

**Reflect on the calibration process*** (Slide 96) What is the value of participating in a process such as this? How does this protocol promote greater equity?
1. **Elements of Effective Feedback**
* (Slide 97) Depending on the level of proficiency demonstrated by the learner, specific, constructive, and timely feedback supports learners as they-together with the teacher-evaluate where they are going, how they are doing, and where they are going next. Feedback should be tied to success criteria.
	+ Where am I going?
	+ How am I going?
	+ Where do I go next?
	+ Progress toward mastery
	+ Feedback should be tied to success criteria

**Closure - Planning Next Steps** * (Slide 98) Use the following questions to support the Graffiti next steps activity
	+ - What misconceptions, if any, does the student have?
		- What feedback would you give each student?
		- What would be your focus for next steps with the student?
* Have participants count off A – F (each poster of student work is labeled A – F) – participants will write on his/her corresponding poster.
* Write an idea for feedback OR idea for next steps (based off of the success criteria).
1. **Anchor Paper Scoring and Rationales**
* (Slide 98) Pass out completed Anchor Paper Rationales. What do you notice about task developers scoring?
* How does this compare to how you scored?
* (Slide 99) Purpose: Identified anchor papers…
	+ Guide formative and summative assessments
	+ Explain why the work is assessed at a specific performance level
	+ Identify where students are in terms of mathematical understanding
	+ Can be examined as a way to understand the learning opportunities we are, or are not, giving our students
	+ Provide consistency in assessment students
1. **Reflection**
* (Slide 101) Use reflection guide to analyze current level of understanding of the rubric, calibration protocol, and feedback.
* (Slide 102) The topic for the jot thoughts reflection is: Think about the rubric, the calibration protocol and the feedback from this module. How could these be used in a classroom? How could these be used in professional development?
 | * [Calibration Protocol Handout](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/6a-calibration-protocol.pdf)
* Template (from previous module)
* [Rich Mathematical Task Rubric](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/5d-rich-math-task-rubric.docx) (in task template)
* [Student work (A-F)](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/6b-bus-task-anchor-papers4PP.docx)
* Scissors
* [Individual Scoring Note sheet](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/6d-ind-scoring-notes-4pp.docx) (1 Per person + 1 extra per table)
* [Anchor paper Rationale](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/3-5/6e-bus-task-scor-rat.docx)
* Poster Paper (6 – one per student)
* Markers
* Reflection guide
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| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **25 minutes TOTAL** | **Session Closure and Reflection** |  |
| 1. Revisit Effect Size Sort (5 min.)
2. Strategy Catcher/Quote

(5 min.)1. Reflect (5 min.)
2. Resources (10 min.)
 | **Session Closure and Reflection**1. **Revisit Effect Size Sort**
* (Slide 104) If time allows, have participants return to their DESMOS sort. Look at how each strategy was sorted at the beginning of the presentation and compare to the chart on the following slide.
* Turn and Talk: What was something that surprised you?
1. **Strategy Catcher**
* (Slides 105 - 106) Discuss/display the strategies used throughout the day and the effect size for each. Highlight the learning intentions for the day.

**Share the quote** * (Slide 107) - Give yourself “permission to spend more time developing students’ deep understanding of mathematics as a well-rounding discipline.” You will save time in the long run by supporting students with a deep understanding of mathematics that will take them beyond the classroom.
1. **Reflect on the Day**
* (Slide 108) Revisit the learning intentions from the entire day and how we have covering each.
* (Slide 109) – Using the 2019 reflection sheet, based on today’s presentation…
	1. One thing I could stop doing is...
	2. One thing I could continue doing is...
	3. One thing I could start doing is...
1. **Review the 2016 Mathematics SOL Instructional Resources**
* (Slide 110) 2016 aligned SOL resources - Emphasize VDOE Rich Tasks added
* (Slide 111) Point out the new Desmos Log of Activities correlated to the 2016 Mathematics Standards of Learning. Many of the existing Desmos-created activities, as well as activities created by Virginia educators, have been reviewed and aligned to the 2016 Mathematics SOL’s and included on the VDOE Desmos Activity Log.  This log, an Excel spreadsheet, contains a tab for each grade-level/mathematics course from Grade 2 through Algebra II.  Each grade level sheet includes a list of SOL-aligned Desmos activities with a brief description and direct link to the activity on the Desmos website.
* (Slide 112) There is a Newsletter available called Teacher Direct. Visit the VDOE webpage and click the “Instruction” link on the left side to access the Newsletter
* (Slide 113) There is a bit.ly to find a complete list of resources as well as the VDOE work on writing tasks. Visit bit.ly/math-institute-3-5
* **Thank you! (**Slide 114) Thank participants for their time and dedication to providing students with opportunities to develop a deeper understanding of mathematics. Remind them to complete the survey that will be emailed to them so that they can receive the certificate of participation.
* Share the VDOE Contact Information.
 | * DESMOS Effect Size Sort
* Reflection Guide – Exit Ticket
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