# Virginia Department of Education

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

### Facilitator’s Guide – Grade Band K-2

## 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 Posters
 |
| **20 minutes**1. Welcome and Introduction

(10 min.)1. Setting the Purpose

(10 min.) | 1. **Welcome and Introductions**
* Welcome participants and introduce facilitators (Slide 2)
* 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!” (Slides 3-10)
1. **Setting the Purpose**
* Share agenda for the day. (Slide 11)
* Opening VDOE Video (Slide 12)
	+ Explain that the team at VDOE has prepared a video for viewing to help set the stage for our work today. (Show video)
 | * [Grade band K-2 Power Point](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/2019-k-2-powerpoint.pptx)
* VDOE Video Introduction
* Parking Lot Poster
* Sticky notes
* [Poster of learning intentions for the day](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/1a-learning-intentions.docx)
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|  | * Share Learning Intentions for the day (Slide 13): 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 intentions: What is the math I am supposed to use and learn today?
	+ Language learning intentions: How should I communicate my mathematical thinking today?
	+ Social learning intentions: How should I interact with my learning community today?
* Read the overarching learning intentions for the day. These learning intentions are for the entire day – much like ones that would be set for a unit of study. During each Module today, success criteria has been set so that participants can gauge their 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** 1. Success Criteria

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

(18 min.)1. Quotes (15 min.)
2. Assessment Capable Learners and the Visible Learning Classroom

(15 min.)1. Effect Size Card Sort

(15 min.)1. Comparison of Institutes

(5 min.)1. Revisit Success Criteria

(5 min.) | 1. **Share the Success Criteria for this module** (Slide 15)
* 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?
	+ Read the Success Criteria for Module 1
1. **Math Identity, Agency and Equity** (Slides 16 – 24)
* Participants will begin to think about creating an equitable environment for teaching and learning math by considering their own experiences as a student in the math classroom.
* Pass out the Math Identity graph. (Slide 17)
	+ Explain that a timeline of mathematical experiences will be created indicating 3 to 5 distinct high and low points. Use the following statements and questions to guide the math story:
	+ 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 (slide 18).
	+ 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.
* Display definitions of math identity and agency. (Slide 19) Ask participants what they believe fosters a positive math identity or a strong sense of math agency? (Accept a few answers from participants.)
	+ Explain that math experiences impact their math identity and agency, which in turn shapes their math mindframe.
	+ Mindframes are ways of thinking about teaching and learning. The mind frames each teacher possesses has a major impact on their students’ learning.
* (slide 20) Research suggests that teachers teach the way they were taught. Explain that some had awesome math teachers in their early math stories and now emulate these teachers in their work. Others have studied and unlearned and relearned good mathematics instruction. Regardless, we want our students to have a positive math identity. We want them to be empowered and see themselves as doers of math. A classroom needs to be created that fosters students who:
	+ 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**
* Invite participants to read the quote. This statement appears as the preface to all the VA Standards of Learning documents at every grade level. During last year’s institute considerable time was spent describing equitable teaching practices. This year connections will also be made to these because equitable classroom experiences can positively impact students’ math identities. (Slide 21)
* Have participants read the equity quotes (pass out quotes). Ask “Which quote resonates most with you?” Go to the corner numbered the same as the quote on the handout. When they get to their corner, discuss with a partner why they chose that quote. Allow 5 minutes to talk with a partner. (Slides 22-23)
* After 5 minutes, ask a few volunteers to share out with the whole group.
* Researchers have identified five equity-based mathematics teaching practices: (Slide 24)
	+ 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 in the quotes and perhaps the discussions you just had.1. **A Visible Learning Classroom is …** 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. We are going to think about what this looks like and sounds like in the classroom. Invite participants to brainstorm (predict) ideas on a plain sheet of paper about visible teaching and visible learning at their tables.

Popcorn share some ideas from their list whole group. (slide 25)* Participants will compare the list to Slide 26. Turn and Talk about the similarities and differences. Refer them to page 26 in their books.
* Teaching mathematics in the visible learning classroom builds and supports **assessment capable learners**. As part of the resources provided, there are videos and online resources available. While watching this video, think about these two questions: (Slide 27)
	+ 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-k-2) – Stop at 3:24.
* Turn and Talk to reflect on the video and questions. Share out as a whole group.
* Share what Assessment-Capable Visible learners can do by displaying the blue map. Refer them to pg. 14 in book. (Slide 28)
* 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 the inside cover of book for a copy of the barometer. (Slide 29)
1. **Effect Size Sort** (Slide 30)
	* Explain that participants will 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 (have paper copies of the card sort available). Click on “create class code” and display code for participants to login on [Desmos webpage](http://www.student.desmos.com/). Facilitator needs to “view dashboard” and click on the “pacing” icon. Select slides 1-3 to disable the following slides (4-6) that reveal the answers. (15 minutes)
	* After about 15 minutes, the facilitator needs to “view dashboard” and remove the pacing restrictions to allow participants to view the “answers.” Slide 31 can be used to share the completed sort for those participants using the paper copies.
	* 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 (Slide 32)
2. **Comparison of Institutes -** 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 and 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 33)
* Remind participants that these all occur in equitable mathematics classrooms where the process goals are valued and used. (Slide 34)
1. **Revisit Success Criteria and Reflection -** Pass out 2019 Reflection Document.
	* Say: It is okay not to have this mastered yet-we will be coming back to these ideas all day.
	* Invite participants to reflect on the Success Criteria for Module 1 by completing 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. (Slide 35)
 | * Grade Band K-2 Session PowerPoint
* [Math Identity Graph handout](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/2a-math-identity-elem.docx) (1 per participant)
* Large Post-It note letters (A-D) posted in corners
* [Equity quotes handout](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/2b-equity-quotes-handout.docx) (1 per participant)
* [Effect Size Card Sort](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/2c-effect-size-card-sort.docx) (2 sets per table)
* [2019 Reflection sheet](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/3-reflection-document_k-2.docx)
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| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **105 minutes TOTAL**(\*10 min 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.)
2. Hamster Cage Task (25 min.)
3. Selecting a Task (60 mins.)
4. Closure (5 mins)
 | 1. **Introduction**
* 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 37)
* Read the Success Criteria for Module 2 (also located on the 2019 Reflection Document p.2) and revisit learning intentions for the institute.
	+ Success Criteria (Slide 38)
		- 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.
	+ Reference the Learning Intentions for the institute (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.
	+ Remind the participants of the effect size for sharing learning intentions and success criteria 1.13.
1. **Hamster Cage Task**
* Present participants with the Hamster Cage Task. (Slide 39 and handout)
* Have participants take a few minutes to solve the task in at least two different ways. Ask them to consider strategies that students might use. Encourage participants to draw pictures or representations of their strategies.
* Turn and Talk: What might be the Learning Intentions for this task? Remind participants of the definitions of the different learning intentions. (Slide 40) As a student’s journey towards mastery of content is considered, first set clear learning intentions.
* Invite teachers to read pages 53-56 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, participants turn and say something brief about what they have read. (Slide 41)
* Tell participants that they will be revisiting the task later in the presentation, but it will be set aside for now.
1. **Selecting a Task**
* Once learning intentions have been clearly identified (Slide 42), then a task is selected to meet these intentions (slide 43). How do the tasks students engage in impact learning?
* (Slide 44) We know that s*tudent 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**
* Let’s examine some tasks and decide whether they require high or low cognitive demand. Pass out the Elementary Task Sort document. Take some time, individually, to decide the cognitive demand level and then share with someone at your table. (Slide 45)
* Pair Square (Slides 46-47) Have participants find a partner from another table and then pair square with another group. Based on how they decided which task required high or low cognitive demand, create a list of criteria on the back of the document.
* Share the definition and characteristics of rich tasks.
	+ How do these compare to the list created of criteria created from the pair square activity?
	+ How are they alike?
	+ How are they different?

Effect size for identifying similarities and differences 1.32 (Slides 48-49).1. **Cognitive Demand of Hamster Cage Task**
* Revisit the Hamster Cage Task. Based on the criteria the teams created, does the task require high cognitive demand? Why or why not? Share out. (Slide 50)
* 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 51)
* 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.) (slide 52)
1. **Anticipating student strategies**
* 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 53)
* One way to ensure your implementation is high is by activating prior knowledge. Let’s return to the Hamster Cage task from earlier. Invite participants to read from Chapter 2 (pages 56-58) to see what the teacher did to plan for this task. (slide 54)
* Reflection on the reading: What are some teaching take-aways to consider when activating prior knowledge? (slide 55)
* Picking the task – “The Goldilocks Challenge”. (slide 56) 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.” (read book p.38)
1. **Surface, deep, and transfer learning**
* Have participants read book 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 57)
* In order to move students through surface, deep to transfer learning, intentional planning is essential. Before implementing the task with students, teachers need to: (Slide 58) –
	+ Establish learning intentions
	+ Select the task
	+ Do the math/Anticipate solutions
	+ Plan advancing/assessing questions
1. **Closure** (Slide 59)
* Participants complete the 3-2-1 structure on learning intentions and success criteria for Module 2 on the 2019 Reflection document:
* 3 things I have learned are...
* Two questions I have are...
* One thing I intend to implement is...
 | * [Hamster Cage Task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/4a-hamster-cage-problem.pdf)
* [Elementary Mathematics Cognitive Demand Task Sort](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/4b-elementary-task-sort.docx)
* 2019 Reflection sheet (continued from previous modules)
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| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **60 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. Introduction (5 min.)
2. Task Presentation (35 min.)
3. Reflection (15 min.)
4. Closure (5 min.)
 | 1. **Introduction**
* Revisit the Teaching Framework for Mathematics. The practice that we will focus on in this module is- Implement tasks that promote reasoning and problem solving. (Slide 61)
* Share the success criteria for this module. (Slide 62)
	+ I can implement a rich mathematical task to support deeper learning for all students.
* 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 63)
* In the previous modules we explored what it meant to facilitate visible learning and how to evaluate, 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 and did the math; anticipating strategies. 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, not only as a teacher, but as a task evaluator and as a student engaged in the learning. Participants will complete the task implementation guide by monitoring, selecting, sequencing, and connecting student learning. (Slide 64)
* 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 65)
* Review the characteristics of a rich task – keeping these in mind as participants with their task evaluator hat on experience the task. (Slide 66)
* 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. (Slide 67)
1. **Task Presentation – (Slides 68-74)**
* Before we get started…(Slide 68) Explain to participants that the blue banners at the top will be a road map for where we are in implementing the task (task launch, do the math, task share, task closure)
* Launch the task by inviting participants to notice and wonder about the image of the balanced scale. Chart responses. Highlight key vocabulary like “balanced” and “equal” and ask participants to elaborate on what those words mean. If it does not come up, ask participants to share a number sentence to represent each side. Statements may be written in words first, such as: 3 and 1 is the same as 2 and 2. Then explain that mathematicians also use symbols to explain their thinking and to show how quantities are related. Rewrite the statements as equations: 3 + 1 = 2 + 2 or 4=4. (slide 69)
* Repeat the Notice and Wonder routine for Slide 70. Write the expression for each side and ask, “Is this balanced? Are these two sides equal?” Encourage participants to share their reasoning by asking, “How do you know they are not balanced?” Ask participants what could be done to make the scale balance? (3 = 3+2? 3=5? 3+1=5-1) Emphasize the use of the +, - symbols to show the action of removing a cube and adding it to the other side.
* Introduce the learning intention by saying, “You know a lot about equality and how to show when two values are the same. Today we will be practicing how to use these symbols to compare quantities and show how they are related.”
* “Today we will use four success criteria to evaluate our work. (read aloud from poster):
	+ *I can describe equality.*
	+ *I can use the equal symbol, numbers, objects and words to represent equivalent values.*
	+ *I can justify my thinking and explain my solution to classmates when creating balanced equations.* (Slide 71)
* As you work, keep these in mind. At the end of our work time, you will reflect on whether you were able to meet these criteria and give me feedback on how you are progressing towards them.”
* Do the task (Slide 72) - “Today’s task is about two first graders. Let’s read the task and think about where we see this idea of equality. (Read task aloud.) Turn to a partner and explain what is going on in this task. Who can explain in their own words what’s happening in this story? Did anything in this problem make you think about equality?” Facilitate a discussion with participants to emphasize the action in the problem and how they are related. Invite them to share what symbols they think could be used to show what is being done to the numbers. Remind participants that there are a variety of tools on their tables they can use to help them solve or represent their work. Ask if anyone needs clarification or has questions.
* Pass out the task and digit cards and invite participants to begin working independently.
* Task Share (Slide 73) - While participants are working, monitor and select participant strategies to share in a whole group discussion. 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.
	+ Solution look-fors:
		- *Two separate expressions, without the equal sign*
		- *Multiple expressions joined by the equal sign (4 + 2 = 6 = 9 – 3 = 6)*
		- *An organized list or use of patterns to find multiple solutions*
	+ Task Closure (Slide 74) - Close today’s task with some personal reflection time. Let’s return to our success criteria (poster). Remember, the success criteria will give you feedback on how you are doing at comparing quantities and using symbols to show how they are related. Take a sticky note and put your initials on it. When you’re ready, place your sticky note on the target at your table. 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** (Slides 75) - 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 three perspectives. Using the following questions, each trio reflects on the task implementation from their designated perspective.
* Questions for discussion (slide 76):
	+ 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?
* Invite the participants to come back together and share out highlights from their discussions. What are some of their takeaways from the task implementation – from any of the three views: teacher, student, or task evaluator?
* Whole group share (slide 77)
1. **Rich Mathematical Task Template Scavenger Hunt** (Slides 78-80)
* Pass out the task template. 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. What do you find most useful about this resource?
* Reflection on the Task Template (Slide 80)

*What was most useful about this resource?* *How will you utilize this resource?*1. **Closure** (Slide 81)

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?*
 | * [Poster of success criteria from first grade task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/5a-equal-task-success-criteria.docx)
* [Digit cards and task sheet from the How can they be equal? task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/5b-equal-task.docx)
* Sticky notes (small)
* Targets (one per table)
* Colored tiles (green, red, and blue)
* [Task template – How can they be equal?](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/5c-equal-task-template.docx)
* Reflection sheet (continued from previous modules)
 |

| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **60 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. Introduction (2 min.)
2. Scoring and Calibration Protocol (8 min.)
3. Preparing Student Work(5 min.)
4. Sorting and Scoring(15 min.)
5. Discussing work (10 min.)
6. Rationales

(5 min.)1. Effective Feedback

(15 min.)1. Closing (20 mins)
 | 1. **Introduction**
* **Success Criteria -** Share the Success Criteria for this module (Slide 83)
1. **Scoring and Calibration: Equality Task** (Slide 84)– Soon we will begin scoring the student work for the Equality task using a calibration protocol.
* **Calibration protocol purpose** (Slides 85-86) – 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, discuss the steps in scoring student work
	+ - Examination – work through task (individual) (this has already been done)
		- Discussion of proficient responses (small group) (begins on slide 87)
		- Read and place in groups (individual)
		- Score student work (Individual)
		- Discussion (small group)
		- Debrief discussion (small group)
1. **Preparing to score student work** (Slides 87) - Since the participants have already worked on the task, 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.
* Revisit the mathematics process goals (slide 88) - 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** (Slides 89-90) – Provide a copy of the student work to each participant. They will need to cut out the work. 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:
	* + Score each student’s work sample using the rubric.
		+ Record their scores on the individual scoring notes sheet.
		+ Record evidence from the student work (aligned to the rubric) to support the score given.
2. **Sharing and discussing student work** (collaboratively) (Slides 91-92)
	* 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).
	* Discussion –Use evidence from the work and the rubric to support the scores.
3. **Anchor Paper Scoring and Rationales** (Slides 93-94)
* Pass out completed Anchor Paper Rationales. Ask what do the participants notice about task developers scoring?
* How does this compare to how they scored? The purpose of the 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 to understand the learning opportunities we are, or are not, giving our students
	+ Provide consistency in assessing students

**Reflect on the calibration process**: (Slide 95)* + 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 96)
* 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
1. **Closure**
* **Planning Next Steps** – Graffiti (Slide 97)
	+ Use the following questions to support the Graffiti next steps activity
* What misconceptions, if any, does the student have?
* What feedback would you give the student?
* What would be your focus for next steps with the student?
	+ Have participants count off A, B, D (each poster of student work is labeled A, B, D) – participants will write on his/her corresponding poster.
	+ Write an idea for feedback OR idea for next steps (based off the success criteria).
	+ Gallery Walk
* **Reflection** (Slide 98) –
	+ Use the 2019 Reflection guide to record their reflections on the protocol for analyzing student work.
	+ 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?
 | * [Student work (A-E)](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/6b-eq-task-anchor-papers.docx) (1 set per participant, to be cut by participants)
* Scissors (couple per table)
* [Calibration Protocol Handout](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/6a-calibration-protocol.pdf)
* [Individual Scoring Notes Sheet](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/6c-ind-scoring-notes-4pp.docx) (1 per participant and 1 extra per table)
* [Anchor paper Rationales](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/6d-equal-task-scor-ration.docx) (1 per every 2 participants)
* Poster Paper (3 – one per student work samples for students A, B, and D)
* Markers
* [Rich Mathematical Task Rubric](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2019/k-2/5d-rich-math-task-rubric.docx)
* Reflection sheet (continued from previous modules)
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| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **30 minutes TOTAL** | **Session Closure and Reflection** |  |
|  | * **Strategy Catcher** (Slides 100-101) - Discuss/display the strategies used throughout the day and the effect size for each. Highlight the learning intentions for the day.
* **Discuss the quote** (Slide 102) - 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 a deep understanding of mathematics that students can apply to multiple concepts.
* **Reflect on Day** (Slide 103-104) – Review the learning intentions for the day and have participants fill out the final reflection using the 2019 reflection sheet, based on today’s presentation…
	+ One thing I could stop doing is...
	+ One thing I could continue doing is...
	+ One thing I could start doing is...
* **Review the VDOE 2016 Mathematics Standards of Learning Instructional Resources** (Slides 105-108)
* **Share the VDOE Contact Information** (Slide 109). Thank participants for their time and dedication to providing students with opportunities to develop a deeper understanding of mathematics.
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