# Virginia Department of Education 2018 Mathematics Institutes

# Facilitator’s Guide – Grade Band 6-8

## 2018 Mathematics Institutes

The purpose of the 2018 Mathematics Institute is to provide teachers with professional development grounded in the implementation of the [2016 *Mathematics Standards of Learning*](http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/2016/index.shtml) to strengthen the teaching and learning of mathematics through facilitating meaningful mathematical discourse, to include: posing purposeful questions; eliciting and using evidence of student thinking; using and connecting mathematical representations; and supporting productive struggle in learning mathematics; as well as supporting equitable learning opportunities for all students.

## Professional Development Instructions

A product of the 2018 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** |
| --- | --- | --- |
| **35 minutes total** | **Module 1: Facilitating Discourse in the 6-8 Mathematics Classroom**  **Essential Question:** What elements must be in place to support meaningful mathematical discourse? | * [6-8 Grade band session Powerpoint](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/2018-institute-ppt-6-8.pptx) |
| 1) Introduction 10 minutes  2)Practices and Process goals 10 minutes  3) Video and discussion 8 minutes  4) Classroom and reflection sheet 7 minutes | 1. Agenda, Welcome and Introductions (Slides 1-6)    1. Introduce facilitators.    2. Share agenda (slide 2).    3. Show parking lot (slide 3). Have a paper version or create an electronic version.    4. Superhero picture: which one doesn’t belong - decide at table and introduce your name when you explain which doesn’t belong (slide 4).    5. Avocado picture: how many?- individually decide how many and tell the table your name again and what you do as you tell how many (slide 5).    6. Share resources for initiating student engagement (slide 6).   **2)** Module 1   1. Discuss essential questions for Module 1 (slide 8). 2. Explain Taking Action book chapters (slide 9). 3. Participants read Slide 9 of teaching practices/book set up to themselves and refer to descriptions presented on page 5 of Taking Action. 4. Remind participants of process goals (slide 10). 5. Distribute Activity: Comparing NCTM Mathematics Teaching Practice to Virginia Mathematics Process Goals for Students (slide 11). 6. Whole group discussion of process goals matching with practices hoping to see that all process goals are associated with each practice (slide 11).    1. Discuss Slide 12 and how the 4 discourse practices are linked and being discussed today.   **3)** Discourse video and reflection (Slides 13-14)   1. Each participant places 5 sticky notes in front of them on the table. 2. Direct participants to write one thought relating to the classroom discourse witnessed on each sticky note as they watch the video. 3. Discuss as a whole group the participant sticky notes. 4. Share reflections on the video.   **4)** Classroom climate   1. Share Slide 15 regarding “in our classroom, we…” 2. Share the Slide 16 regarding Mathematics Community - what it is not and what it is. 3. An envelope on your table has “teacher role” in LIGHT GREEN and “building student responsibility within the community” in GRAY. As a table, place the descriptors in order from 0 - 3. Independently consider where you are in your classroom in both. Participants will receive the table at the end of the day with all the correct placements. (Slides 17 -19).   **5)** Reflection (Slides 20-21)   1. Review the essential questions again. 2. Explain the reflection document - completing how you will include in your classroom instruction and how you will share this professional development with others. 3. Direct participants to complete the module 1 portion of the reflection document. | * [Activity: Comparing NCTM Mathematics Teaching Practice to Virginia Mathematics Process Goals for Students](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/teach-pract-process.docx) * [Levels of Classroom Discourse Sort](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/clssrm-discourse-sort.docx) * [Reflection document](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/reflection-document.docx) |

| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **120 minutes total** | **Module 2: Teaching Practices: Posing Purposeful Questions and Elicit and Use Evidence of Student Thinking**  **Essential Questions:** How does **posing purposeful questions** promote equitable learning opportunities for all students?  How does **eliciting and using evidence of student thinking** support efforts to pose purposeful questions? |  |
| 1) and 2) instruction on questioning 15 minutes  3) - 5) Task and Desmos 40 minutes  6) - 8) Jigsaw and questioning share 40 minutes  9) research and equity for Pose Purposeful Questioning 5 minutes  10) research and equity for Elicit and Use Evidence of Student Thinking 5 minutes  11) levels of Classroom discourse sort 10 minutes  12) Reflection 5 minutes | 1. As we begin Module II (slides 22 - 23) share the essential questions (slide 24). 2. Share slide 25: the reason we are asking and planning purposeful questions. 3. Slides 26 - 27 tell participants about five types of questions and assessing and advancing questions. 4. Share the scientific calculator and Virginia edition (slide 28). 5. Begin the lemonade task which is centered around 2016 SOL content (refer to curriculum framework) (slides 29 - 31).    1. 6.1, 7.1 8.1 6.12, 7.10, 8.16 6. Launch the task (slide 32). 7. Work on the task independently (3 minutes), then with a partner (4 minutes), share your partner’s strategy with table mates (4 minutes) then discuss as a whole group as facilitators have determined a selection of work and a sequence for presentation(slide 33). 8. Distribute Questions that foster discussion and question stems for participants to use while completing the jigsaw. (slide 34) 9. Jigsaw with student work (slides 35-36).    1. Select a letter card from the center of the table.    2. Rearrange to meet with others who have the same letter.    3. Distribute student work to new groups.    4. Participants brainstorm purposeful questions and write those on their paper.    5. Facilitators observe at this time deciding which questions are best to fill in parts of the “Question Recording Chart”.    6. Participants return to original table and pair up (A/E, B/F, C/G, D/H) and share with the whole group the student work and the questions created.    7. Whole group share out (slides 37 - 40) with facilitators calling on specific participants from the “Question Recording Chart” (slide 41). 10. Pose purposeful questions research and equity slides (slides 42-43). 11. Elicit and use evidence of student thinking research and equity slides (slides 44-45). 12. The envelope on your table has “questioning” in LIGHT YELLOW and “explaining mathematical thinking” in BLUE. As a table, place the descriptors in order from 0 - 3. Independently consider where you are in your classroom in both. Participants will receive the table at the end of the day with all the correct placements (slides 46-48). 13. Facilitator distributes Mathematics Teaching Practices: Supporting Equitable Mathematics Teaching, reminds participants of essential questions and participants complete reflection document (slides 49-51) | * [Lemonade Task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/lemonade%20stand%20task.docx) * [Curriculum Framework](http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/2016/cf/grade6math-cf.pdf) * [Lemonade Task Select Sequence Connect Guide](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/lem-select-seq-con-guide.docx) * [Lemonade Stand Student Work](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/lem-stand-student-work.docx) * [Questions that foster discussion](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/quest-that-foster-disc.docx) * [Question stems](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/question-stems.docx) * [Question stems Posters](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/question-stem-posters.docx) * [Letter Cards](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/letter-cards.docx) * [Question Recording Chart](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/quest-recording-chart.docx) * Levels of classroom discourse sort (link in Module 1) * [Mathematics Teaching Practices: Supporting Equitable Mathematics Teaching](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/teach-pract-equit-teach.docx) * Reflection Document (link in Module 1) |

| **Approximate Time** | **Facilitator Instructions** | **Materials** |
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| **125 minutes total** | **Module 3: Teaching Practices: Support Productive Struggle in Learning Mathematics and Use and Connect Mathematical Representations**  **Essential Questions:** How does **supporting productive struggle** promote student agency and identity?  How does **using and connecting mathematical representations** improve efforts to support productive struggle? |  |
| 1)-3) Desmos 10 minutes  4)-6)Telling the tale task 6th grade 15 minutes  7) Support Productive Struggle 10 minutes  8) 7th grade task 15 minutes  9)-10) Desmos 25 minutes  11) 8th grade task 10 minutes  12) Desmos 10 minutes  13) Curriculum framework -5 minutes  14) New expectations for students 10 minutes  15)-17) equity Discussion and Discourse Sort 10minutes  18) summary and reflection 5 minutes | 1. Use the Desmos activity to share with participants different options on the program (slide 52). 2. Show Teacher.Desmos.com regarding how to set up the activity just completed (slide 53). 3. Share the quote to remind teachers that middle school is both the capstone and the cornerstone (slide 54). 4. Share Module III Essential Questions (slides 55 - 57). 5. Telling the Tale task (slides 58-59) is centered around 2016 SOL content.    1. 6.12, 7.10, 8.16    2. 6.7, 7.4, 8.6 6. Launch task, work independently on the 6th grade task then with group (slide 60-62). 7. What four types of teacher responses, supporting students who can’t get started, strategies to support productive struggle (slides 63 - 65). 8. Participants work on the 7th grade task (slides 66 - 68). 9. Share how “Desmos to make connections” could be used to solve Part II (slide 69). 10. Share the “Telling the Tale Lesson Plan” which was created prior to the task. Encourage teachers to always create something like this (slide 70). 11. Participants work to complete the 8th grade task (slides 71 - 72). 12. Share more Desmos to relate to the 8th grade task (slide 73). 13. Look deeply at the curriculum framework, both the essential knowledge and skills and the understanding the standard. Define which grade gets to do which skill and require which understandings (slide 74). 14. Direct participants to get into 5 groups, distribute a different “new expectation for students” to each group, have groups brainstorm the teacher actions consistent with the expectations and the indicators of success. Share out whole group (slides 75 - 80). 15. Share how supporting productive struggle promotes equity (slide 81). 16. Discuss Research and promoting equity for the practice of Use and Connect Mathematical Representations (slide 82 - 84). 17. Direct participants to complete the last sort in the levels of classroom discourse, ORANGE, “mathematical representations” (slides 85 - 86). 18. Pass out the completed Levels of Classroom Discourse handout. 19. Review essential questions for Module III and ask them to complete the Module III section of the reflection document (slides 87 - 88). | * [Telling the Tale 6th grade task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/task-telling-tale-6-12.docx) * [Telling the Tale 7th grade task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/task-telling%20tale-7-10.docx) * [Desmos to make connections](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/desmos-to-make-con.docx) * [Telling the Tale Lesson Plan](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/tale-lesson-plan.docx) * [Telling the Tale 8th grade task](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/task-telling%20tale-8-16.docx) * [New Expectations for Students](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/new_expect-for-students.docx) * Levels of classroom discourse sort (link in Module 1) * [Levels of Classroom Discourse Handout](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/levels-of-class-discour.docx) * Reflection document (link in Module 1) |

| **Approximate Time** | **Facilitator Instructions** | **Materials** |
| --- | --- | --- |
| **25 minutes total** | **Module 4: Taking Action**  **Essential Question:** How will the teaching practices shared today **(Supporting Productive Struggle**, **Posing Purposeful Questions**, **Using and Connecting Mathematical Representations**, and **Eliciting and Using Evidence of Student Thinking)** facilitate meaningful mathematical discourse? |  |
| 1) - 2) Summary 10 minutes  3) Video 10 minutes  4) Reflection and closure 5 minutes | 1. Begin Module 4 and share the essential questions (slides 89 - 90). 2. Provide summary of big ideas of the first three modules (slide 91). 3. Provide a summary of the 4 discourse mathematical teaching practices focused on today (slide 92). 4. Have participants watch the video and complete the video reflection sheet looking for the discourse strategies used during the training (slide 93). 5. Share VDOE resources (slide 94). 6. Ask participants to reflect on the entire training (slides 95 - 96). | * [Video reflection sheet](http://www.doe.virginia.gov/instruction/mathematics/professional_development/institutes/2018/6-8/video-reflection-sheet.docx) |
|  | **Closure:**   * Reflection | * Reflection document (included in Module 1) |