Math Module 4 Overview Plan
Module Title: Number and Operations in Base Ten: Place Value and Fluency
Grade Band: K–5

Module 4 explores the domain Number and Operations in Base Ten with a focus on place value and fluency. Each of this module's session is designed to increase understanding of place value standards and how they should be implemented in the elementary classroom.

In Session 1, participants will experience parts of several EngageNY lessons and will analyze the lessons for evidence of how students engage in the key shifts.

Session 2 will provide participants with an opportunity to study a set of standards from the domain of Number and Operations in Base Ten and explore coherence among the grade levels, using a vertical alignment chart.

In Session 3, participants will study *procedural fluency*. Participants will explore the process of achieving procedural fluency, and they will relate procedural fluency to the standard algorithm as called out by the standards.

Session 4 will act as a continuation of the "5 practices for orchestrating productive mathematics discussions" conversation. The focus for this session will be Practices 3 and 4—*selecting* student responses and *sequencing* them. Participants will learn how strategically selecting and sequencing students' responses to tasks can help build mathematical understanding.

Session 5 continues participants' work with the Planning Guide that helps teachers (1) facilitate productive collaborative planning sessions based on the standards and (2) determine the implications for teaching and learning.

Session 6 is grounded in an Agile Mind article, "Persistence and effective effort," to enable participants to reflect on their own experiences with struggle and to connect these experiences to supporting students in productive ways. Participants connect the research discussed in the article to the curriculum by examining an EngageNY lesson for their grade level and identifying places in the lesson that support students in persistence and effective effort.

Elementary Mathematics Module 4: Key Understandings

After Module 4, participants will know:

- The key shifts play a critical role in the implementation of the LSSM:
  - *Focus*—by narrowing in on fewer topics in a lesson or unit to ensure teachers have adequate time to push students toward mastery of key mathematical concepts.
  - *Coherence*—by viewing the standards as interconnected across grade levels and across domains within a grade level, rather than as isolated events.
  - *Rigor*—by ensuring that conceptual understanding, procedural skills, and fluency drive the exploration of mathematical content at greater depths, culminating with the ability to apply mathematics to solve real-world problems.
- When instruction using the EngageNY curriculum is executed well, the key shifts are evident and visible in every lesson.
- It is important to select student responses that highlight specific strategies or misconceptions and to sequence these responses to present in a way that helps students make connections and deepen their mathematical understanding.
- Adults play a significant role in helping students use proven strategies, and adults are key to cultivating attitudes and beliefs that support students' development of persistence and application of effective effort.

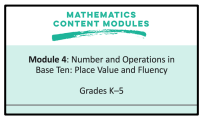
Module 4: Facilitation Recommendations	
Session Length	Six-hour module including: **Session 0: Introduction** to Module 4 (5 minutes) **Session 1: Key Shifts in Action**—Through an EngageNY Lesson (60 minutes) **Session 2: Exploring Coherence** in the Louisiana Student Standards for Mathematics (LSSM) (60 minutes) **Session 3: Deepening Mathematical Content Knowledge** for Effective Instruction (80 minutes) **Session 4: Instructional Strategies** to Improve Curriculum Implementation (60 minutes) **Session 5: Purposeful Planning** of the EngageNY Curriculum (60 minutes) **Session 6: The Role of a Productive Classroom Culture** in the EngageNY Curriculum (40 minutes)
Session Pairing Options	Recommended delivery: One full 6-hour day of professional learning, with all 6 sessions facilitated back to back. Facilitators should plan for participants to take the Module 4 evaluation immediately after Session 6, preferably before leaving the session.
Time of Year	Third quarter

Preparing to Facilitate *What materials and supplies are needed to facilitate this session?* *What must the facilitator do to prep for the actual session?*		
Session Materials		

Participant Handouts
• **M4_P-00** Printed copy of Module 4 presentation slides (printed 2 slides to a page)
• **M4_P-01** Looking for Evidence of Student Engagement in the Key Shifts
• **M4_P-02** Place Value Chart
• **M4_P-03** Vertical Alignment Chart
• **M4_P-04** Required Fluencies in the LSSM
• **M4_P-05** Planning Guide
• **M4_P-06** Persistence and Effective Effort
	Facilitator Handouts
	• **M4_CL-00** Math Module 4 Overview: Numbers and Base Ten: Place Value and Fluency
	• **M4_CL-01** Posters and Handouts Guide
	M4_CL-02 math-g1-m4-topic-a-lesson-2: Lesson 2: Objective: Use the place value chart to record and name tens and ones within a two-digit number.
	• **M4_CL-03** math-g2-m3-topic-e-lesson-11: Lesson 11: Objective: Count the total value of ones, tens, and hundreds with place value disks.
	• **M4_CL-04** math-g4-m1-topic-a-lesson-2: Lesson 2: Objective: Recognize a digit represents 10 times the value of what it represents in the place to its right.
	• **M4_CL-05** Standards Cards for Vertical Alignment
	• **M4_CL-06** Required Fluencies in the LSSM: Answer Key
	• **M4_CL-07** Lesson 2 Exit Ticket: Student Work
		Facilitator Pre-Work and Prep
		• Print participant handouts (1 per participant)
		• Cut sets of place value disks, one set per group of four participants. The place value disks are on the second to the last page of handout **M4_CL-03** math-g2-m3-topic-e-lesson-11
		
		Secure supplies, including
		• Base-Ten Blocks (1 set per group)
		• Linking Cubes (1 set of 40 per group)
		
		• Chart paper
		• Table supplies, including
		  ○ Markers
		  ○ Scissors
		  ○ Sticky notes
		  ○ Glue sticks or tape

Math Module 2, Session 0
Session Title: Introduction to Module 4

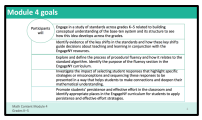
Time & Slide Thumbnail	Facilitator Notes Session 0: Introduction to Module 4	Materials


 	
Slide 1:
Time Allotted:
1 minute
	Module 4: Number and Operations in Base Ten: Place Value and Fluency
	
	Time Allotted for module: 6 hours
	
	Slides 1–4: Time Allotted: 8 minutes
	
	Critical Idea
	• It is important to set a positive tone for learning.
	
	Step-by-Step Instructions
	• Before each session, use handout **M4_CL-01 Posters and Handouts Guide** to organize your preparation.
	• As participants come in for the day, ask them to sit in mixed-grade-level groups of four.
	• Welcome the group.
	• Say,
	  ○ "Throughout the learning sessions you will engage in mathematics tasks and discussions designed to strengthen your understanding of the LSSM, and you will have multiple opportunities to consider ways that you can continue to support students' learning of mathematics content through the high-quality curriculum."
	• Take care of "housekeeping" items prior to starting the session:
	  ○ Scheduled start and stop times
	  ○ Breaks
	  ○ Lunch
	  ○ Location of restrooms
	  ○ Silencing of cell phones
	  ○ Orienting participants to the handouts for the day, including the handout of the slides.
	
	Words of Wisdom
	• If you perceive any resistance, the basic strategy is to
	(1) acknowledge the resistance,
	(2) honor and validate it with a reason or two,
	(3) provide a rationale for engaging, and
	(4) tie it to the work of the session.
		M4_CL-01
		Posters and Handouts Guide

Time & Slide Thumbnail	Facilitator Notes Session 0: Introduction to Module 4	Materials

Slide 2
Time Allotted:
2 minutes
	Critical Idea
	• For participants to buy in to the project, it is important to provide them with the goal and purpose.
	
	Step-By-Step Instructions
	• Say,
	  ○ "Recall this slide from previous modules. The work in which you are engaged is part of a bigger picture."
	  ○ "The overarching goal of the initiative is to improve the quality of instruction in math classrooms by developing deep mathematical content knowledge of teachers and connecting that content knowledge to the practical implementation of a quality curriculum."
	
	Words of Wisdom
	• This slide provides participants with the goal of the three-year initiative.	

Slide 3
Time Allotted:
3 minutes
	Critical Idea
	• Being clear about how a group is expected to collaborate creates an environment that fosters intellectual risk-taking and reflection.
	
	Step-By-Step Instructions
	• Say,
	  ○ "To meet the goals and learning expectations of the initiative, we have group norms that will continue to guide our collaborative work."
	  ○ "Please independently read the slide and choose one of the norms you will pay particular attention to throughout Module 4."
	• As a way to encourage accountability, ask participants to tell their tablemates which norm they selected.
	
	Words of Wisdom
	• Norm-setting is an important step that sets the tone for professional learning. Asking participants to share the norms they will focus on encourages ownership and buy-in to these guidelines.
	
	Citation: These norms have been adapted from recommendations in a variety of sources, including:
	National Research Council. (2000). How people learn: Brain, Mind, Experience, and School. Washington, DC: The National Academies Press.
	The last norm ("Mistakes are expected, respected, and inspected") was shared by Jo Boaler in an early version of her online course. A current version, "How to Learn Math: For Teachers," is available here: http://scpd.stanford.edu/ppc/how-learn-math-teachers	

 Slide 4 Time Allotted: 2 minutes	***Critical Idea*** • The lens for learning is beginning with the end in mind. ***Step-by-Step Instructions*** ○ Ask participants to quietly read the Module 4 learning expectations. ***Words of Wisdom*** • This slide should be brief and is about clarifying the learning expectations for Module 4.	

Math Module 4, Session 1
Session Title: Key Shifts in Action—Through an EngageNY Lesson

Session Overview *What are the overarching goals of this session?* *Why are those goals important? How do they connect to what's come before and what will come after?*
The overarching goals of Session 1 are for participants to review the key shifts of the Louisiana Student Standards for Mathematics and to experience the key shifts in action by taking part in a portion of an EngageNY lesson. Participants should be able to document evidence of possible student engagement during the lesson, which will refine participants' understanding of the key shifts and how these shifts will manifest in the classroom. The EngageNY lessons will focus on standards within the Number and Operations in Base Ten domain, and this set of lessons will serve as an ongoing example through many of the other sessions in this module.

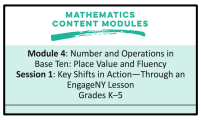
Session Key Points *What are the 2 to 4* most *important takeaways from this session?*	**Session Products** *What will participants produce during the session? Immediately following the session?*
Through Session 1, participants will know: • The key shifts play an integral role in the EngageNY curriculum. • Being aware of the coherence of the standards can influence how intentional teachers are in connecting to prior learning.	• During Session 1, participants will produce a document of evidence of student work that participants experience during the EngageNY lesson.

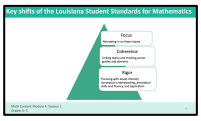
Session Objectives *What will participants know, believe, and be able to do as a result of this session?*	**Session Agenda at a Glance** *What is the overall flow of this session?*
Participants will … • Look for evidence of the key shifts of focus, coherence, and rigor in the standards. (CP, CK) • Engage in mathematics learning experiences that help clarify math concepts related to multiplication and division of whole numbers. (CK, CP, CS) CK: Content Knowledge CP: Content Pedagogy CS: Curriculum Skills	• Engage in a review of the key shifts. • Participate in a math learning experience with an EngageNY lesson. • Analyze the lesson for student evidence of the key shifts.

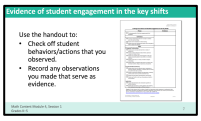
Facilitation Recommendations	
Session Length	60 minutes

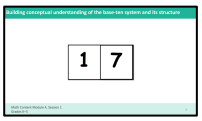
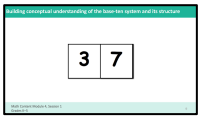
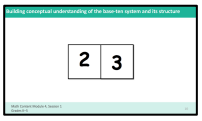
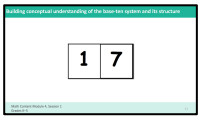
Preparing to Facilitate *What materials and supplies are needed to facilitate this session?* *What must the facilitator do to prep for the actual session?*	
Session Materials • **Participant Handouts** ○ **M4_P-01** Looking for Evidence of Student Engagement in the Key Shifts ○ **M4_P-02** Place Value Chart • **Facilitator Handouts** ○ **M4_CL-02 math-g1-m4-topic-a-lesson-2: Lesson 2:** Objective: Use the place value chart to record and name tens and ones within a two-digit number ○ **M4_CL-03 math-g2-m3-topic-e-lesson-11: Lesson 11:** Objective: Count the total value of ones, tens, and hundreds with place value disks ○ **M4_CL-04 math-g4-m1-topic-a-lesson-2:** Lesson 2: Objective: Recognize a digit represents 10 times the value of what it represents in the place to its right. • **Additional Supplies** ○ Chart paper ○ Markers ○ Sticky notes ○ Linking Cubes (1 set of 40 per group) ○ Base-Ten Blocks (1 set per group) ○ Place value disks (found on the last page of **M4_CL-03** math-g2-m3-topic-e-lesson-11: Lesson 11: Objective: Count the total value of ones, tens, and hundreds with place value disks)	**Facilitator Pre-Work and Prep** • Print participant handouts (1 per participant) • Print a copy of **M4_P-02** Place Value Chart, one per participant • Study the EngageNY lesson handouts ○ **M4_CL-02 math-g1-m4-topic-a-lesson-2: Lesson 2:** Objective: Use the place value chart to record and name tens and ones within a two-digit number ○ **M4_CL-03 math-g2-m3-topic-e-lesson-11: Lesson 11:** Objective: Count the total value of ones, tens, and hundreds with place value disks ○ **M4_CL-04 math-g4-m1-topic-a-lesson-2: Lesson 2:** Objective: Recognize a digit represents 10 times the value of what it represents in the place to its right. • Cut sets of place value disks, one set per group, found on the second to the last page of lesson **M4_CL-03** math-g2-m3-topic-e-lesson-11. Ideally, the discs should be printed on cardstock, but paper will work. The discs do not have to be cut out as circles; the activity will work if they are cut out with straight cuts to make squares. • Gather Base-Ten Blocks (1 set per group) • Gather Linking Cubes (1 set of 40 per group)

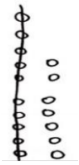
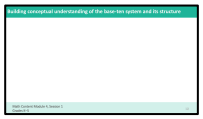
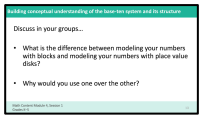
Participant Pre-Work *What should participants bring to this session? What should they do or prepare in advance of this session?*	
Participants must bring: ○ Not applicable	**Before this session, participants should:** ○ Not applicable

Time & Slide Thumbnail	Facilitator Notes Session 1: Key Shifts in Action—Through an EngageNY Lesson	Materials
 Slide 5 Time Allotted: < 1 minute	**Session 1: Key Shifts in Action** through an EngageNY lesson **Slides 5–16 Time Allotted: 60 minutes** ***Critical Idea*** • This slide introduces Session 1. ***Step-By-Step Instructions*** • Say, ○ "Let's transition into Session 1, which focuses on understanding mathematics content through task analysis." **Words of Wisdom:** • For Session 1, participants should be sitting in mixed-grade-level groups of four.	


Slide 6
Time Allotted:
2 minutes
	Critical Idea
	• The key shifts are what make the LSSM different from previous standards. These key shifts should guide decisions about teaching and learning.
	
	Step-By-Step Instructions
	• Say,
	  ○ "In Module 1 we defined the 3 key shifts of the LSSM, and we identified evidence of focus, coherence, and rigor in the standards."
	  ○ "For this session, it is important to think about how these key shifts surface in the classroom. To ground our thinking, please revisit the definitions of the key shifts on the slide."
	
	Words of Wisdom
	• Keep this slide simple and brief.	

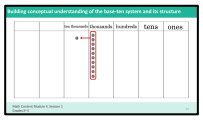

Slide 7
Time Allotted:
3 minutes
	Critical Idea
	• The key shifts are what make the LSSM different from previous standards. These key shifts should guide decisions about teaching and learning.
	
	Step-By-Step Instructions
	• Say,
	  ○ "We are going to engage in a portion of a mathematics lesson from EngageNY to give you an opportunity to observe how the key shifts come to life in the classroom while students engage in the mathematics content."
	  ○ "It is important to note, though, that while the task may not be aligned to the grade level you teach, the experience is intended to surface ways in which you can connect the EngageNY lessons to inform your teaching and learning. By the end of the 6 modules, you will have had the opportunity to experience a variety of lessons from grades K–5."
	  ○ "To help you with this experience, we will continue to use the **Looking for Evidence of Student Engagement in the Key Shifts** tool (that we used in previous modules) to help you look for and document evidence of the key shifts."
	• Ask participants to locate handout **M4_P-01 Looking for Evidence of Student Engagement in the Key Shifts**.
	• Say,
	  ○ "Remember, the left-hand column contains descriptors of how the student may engage in the key shifts. Next to each descriptor is a box you can use to check off any of the student actions that you observe in the lesson."
		M4_P-01
		Looking for Evidence of Student Engagement in the Key Shifts

Time & Slide Thumbnail	Facilitator Notes Session 1: Key Shifts in Action—Through an EngageNY Lesson	Materials
	○ "You can use the right-hand column to document your observations of any specific actions that can be used as evidence for the descriptors that you checked in the left-hand column." • Give participants time to refamiliarize themselves with the handout and to ask questions if they need further clarification. ***Words of Wisdom*** • Make sure all participants have an opportunity to read through the document to familiarize themselves with the descriptors of the key shifts. Participants will use these descriptors to make observations while they engage in the math lesson. • During this lesson, participants may make connections and have "ah-ha" moments related to the content. It is important for participants to understand that these connections may not happen as quickly in the classroom with their students. The EngageNY curriculum is designed for students to make these connections across multiple lessons.	
    Slides 8–11 Time Allotted: 10 minutes	***Critical Idea*** • The key shifts are what make the LSSM different from previous standards. These key shifts should guide decisions about teaching and learning. ***Step-By-Step Instructions*** • Before beginning the lesson, pass out a set of linking cubes to the participants (at least 40 linking cubes per group or set of partners). • Say, ○ "To observe how students would engage in the key shifts in the classroom, we will take part in a portion of an EngageNY lesson from three different grade levels." ○ "As you engage in the lesson, use **M4_P-01 Looking for Evidence of Student Engagement in the Key Shifts** to document evidence of the key shifts." ○ "Remember, the purpose of experiencing this lesson is to get a clearer understanding of how students should engage in the mathematics as described in the key shifts." ○ "In addition, you should engage in the math lesson as a learner—that is, as if you were the students—and you should look for and document evidence of engagement in the mathematics through the key shifts." • **Animate the slide** to display the number cards for the number 17. • Say, ○ "These are Hide Zero cards. What number do you see?" (*seventeen*) ○ "When I pull apart these cards, the number 17 will be in two parts. What do you think the two parts will be?" (*10 and 7*) • **Animate the slide** to show the cards pull apart. • Say, ○ "The number 17 can be pulled apart to make 10 and 7." ○ "Show me 17 using your linking cubes." • Give a minute for participants to work with their partners to build 17 with their linking cubes. If participants count out 17 cubes and break them apart separately, ask them to try to make as many tens as possible. • Say, ○ "How many tens, or ten-sticks, do you have?" (*1 ten*)	**M4_P-01** Looking for Evidence of Student Engagement in the Key Shifts Chart paper Markers Linking cubes

Time & Slide Thumbnail	Facilitator Notes Session 1: Key Shifts in Action—Through an EngageNY Lesson	Materials
	○ "How many extra ones do you have?" (*7 ones*) • Repeat this process for slides 9 and 10, using the numbers 37 and 23. • Display slide 11. • On a sheet of chart paper, draw a T-chart. • Say, ○ "I can write my 1 ten here in this chart." • Write the number 1 on the left side of the T-chart. ○ "If this represents my 1 ten, how many extra ones do I have?" (*7 ones*) ○ "Where should I write the 7?" (*in the second column*) • Write the 7 on the right side of the T-chart. ○ "With your cubes, show me what the 1 stands for." • Participants should hold up a ten-stick of cubes. ○ "So, if the 1 stands for 1 ten, I can label this column *tens*." • Write the word *tens* at the top of the left column. ○ "Show me what the 7 stands for with your cubes." • Participants should hold up 7 cubes. ○ "So, if the 7 stands for 7 ones, I can label this column *ones*." • Write the word *ones* at the top of the right column. ○ "Look at the chart we just made. This is called a *place value chart."* ○ "If I have 1 ten and 7 ones, what number of cubes do I have?" (*17 cubes*) ○ "Let's represent our 17 cubes with a drawing." • Under the place value chart, draw a picture representing the number 17:  • Transition to the next slide for the next part of the lesson. ***Words of Wisdom*** • The purpose of these slides is to help participants understand how the key shifts support teaching and learning and leads to deeper understanding.	
  Slides 12–13 Time Allotted: 10 minutes	***Critical Idea*** • The key shifts are what make the LSSM different from previous standards. These key shifts should guide decisions about teaching and learning. ***Step-By-Step Instructions*** • Before beginning this portion of the lesson, pass out to participants sets of ○ Base-Ten blocks and ○ printed and cut out place value disks. (The place value disks are on the second to the last page of handout **M4_CL-03 math-g2-m3-topic-e-lesson-11**.) • Say, ○ "We are going to transition from first-grade place value concepts to second-grade place-value concepts." • **<u>Animate the slide</u>** to display the number 13. ○ "Using your Base-Ten blocks, show me this number." • Give participants a minute to build the number 13. ○ "What is this number?" (*13*) ○ "How many tens and ones does the number 13 have?" (*1 ten and 3 ones*) ○ "Can you show me the same number with your place value disks?"	**M4_P-01** Looking for Evidence of Student Engagement in the Key Shifts Chart paper Markers Base-10 blocks Place value disks (the place value disks are on the second to

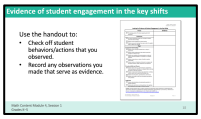
Time & Slide Thumbnail	Facilitator Notes Session 1: Key Shifts in Action—Through an EngageNY Lesson	Materials

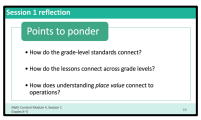
	• Give participants a minute to show 13 with the place value disks using one 10 disk and three 1 disks.
	• **<u>Animate the slide</u>** to show the number 103.
	  ○ "Show me this number with your Base-Ten blocks."
	• Give a minute for participants to build the number 103 with their Base-Ten blocks.
	  ○ "What is this number?" (103)
	  ○ "How many hundreds, tens, and ones does the number 103 have?" (1 hundred, 0 tens, and 3 ones)
	  ○ "Can you show me the same number with your place value disks?"
	• Give participants a minute to show 103 with the place value disks using one 100 disk and three 1 disks.
	• Repeat this process with the remaining numbers on the slide (129, 230, and 200).
	• **<u>Display slide 13</u>**.
	• Say,
	  ○ "Discuss the questions on this slide with your group members."
	• Allow no more than 3 minutes for groups to discuss the questions. Then hear some share outs from some groups.
	• Transition to the next slide for the next part of the lesson.
	
	Words of Wisdom
	• The purpose of these slides is to help participants understand how the key shifts support teaching and learning and lead to deeper understanding.
		the last page of handout **M4_CL-03** math-g2-m3-topic-e-lesson-11.
		
		These place-value discs should have be printed and cut out prior to this session.)


Slide 14
Time Allotted:
15 minutes
	Critical Idea
	• The key shifts are what make the LSSM different from previous standards. These key shifts should guide decisions about teaching and learning.
	
	Step-By-Step Instructions
	• Before beginning this portion of the lesson, have participants locate handout **M4_P-02 Place Value Chart**.
	• Say,
	  ○ "For the remainder of this learning experience, we are going to transition from Grade 2 place value concepts to Grade 4 concepts."
	• **<u>Display slide 14</u>**.
	• Say,
	  ○ "Looking at the slide, label ones, tens, hundreds, and thousands on your place value chart like the chart on the slide."
	• Give participants a minute to label their charts.
	  ○ "How many hundreds does it take to make 1 thousand?" (*10 hundreds*)
	• On a sheet of chart paper, write the equation *10 x 1 hundred is 1 thousand*.
	• **<u>Animate the slide</u>**.
	• Say,
	  ○ "We are going to represent 1 thousand on our place value charts using place value disks by drawing a dot in the thousands place."
	  ○ "Draw place value disks on your chart to show 10 times 1 thousand."
	• Give participants a minute to represent 10 x 1 thousand on their place value charts. Walk around and look for someone who drew 10 dots in the thousands column on their chart. Call on this person to share what they did.
	• **<u>Animate the slide</u>** to show 10 dots in the thousands place.
	  ○ "What does this image represent?" (*10 times 1 thousand is 10 thousand*)
		M4_P-01 Looking for Evidence of Student Engagement in the Key Shifts
		
		M4_P-02 Place Value Chart
		
		Chart paper
		
		Markers

Time & Slide Thumbnail	Facilitator Notes Session 1: Key Shifts in Action—Through an EngageNY Lesson	Materials
	○ "How else can 10 thousands be represented?" (*the 10 thousands can be bundled and moved to the next column*) • **Animate the slide**. ○ "What would the name of our next column after the thousands be?" (*ten thousands*) • **Animate the slide**. ○ "How could we write the multiplication sentence for 10 times the value of 1 thousand? Talk to your elbow partner to come up with a multiplication sentence." • Give one minute for participants to talk and come up with a multiplication sentence. Call on a participant to share. • Record *10 x 1 thousand is 10 thousand* on your chart paper. ○ "Using your next place value chart on your handout, work with your elbow partner to show what 10 times the value of 1 ten thousand equals, then write the equation." • Give participants a minute to work with their elbow partners. • Call on a few participant groups to share their thinking and to explain how they represented their thinking on their charts. • Record the equation *10 x 1 ten thousand is 1 hundred thousand* on your chart. • Reference the equations written so far on the chart and say, ○ "If I continued this pattern, what would be my next equation?" (*10 x 1 hundred thousand*) ○ "Use the next place value chart on your handout to solve 10 times 1 hundred thousand." • Give participants a minute to solve with their elbow partners. • Say, ○ "If we bundle 10 hundred thousands, what do we get?" (*1 million*) ○ "Title your last column as *millions* and complete our equation." • Complete the equation on your chart paper by adding *is 1 million* to the end. • Say, ○ "If we know 10 ten thousands can be bundled to make 1 hundred thousand, what would the equation 10 x 4 ten thousands equal? Use your last place value chart and work with your elbow partner to solve this equation." • Write the equation 10 x 4 ten thousands on the chart paper for participants' reference while they work. • Give a couple minutes for participants to work together to solve and represent this equation. • Have a few participant groups share out their thinking and how they represented the equation on their place value charts. (*10 x 4 ten thousands is 4 hundred thousand*) • Transition to the next slide. ***Words of Wisdom*** • The purpose of these slides is to help participants understand how the key shifts support teaching and learning and leads to deeper understanding.	

Time & Slide Thumbnail	Facilitator Notes Session 1: Key Shifts in Action—Through an EngageNY Lesson	Materials


 	
Slide 15
Time Allotted:
10 minutes
	Critical Idea
	• Intentional teacher moves support focus, coherence, and rigor around the mathematics content.
	
	Step-By-Step Instructions
	• Say,
	  ○ "During the lessons, you were asked to use handout **M4_P-01 Looking for Evidence of Student Engagement in the Key Shifts** to check off student behaviors/actions observed in the lesson. Please take 3 minutes of independent think time to record specific evidence of the descriptors in the right-hand column of the page."
	• Give 5 minutes for participants to work with their groups to complete their handouts.
	• Ask for participants to share out evidence of the key shifts for each of the lessons.
	• Ask,
	  ○ "How did the elements of rigor change as we progressed through the lessons?"
	  ○ "Where did you see evidence of coherence across the lessons?"
	• Hear a few share outs to these questions, then transition to the next slide.
	
	Words of Wisdom
	• The elements of rigor will vary depending on the grade-level lesson participants are referencing. They should use the evidence section to be specific about which grade level they are referring to when marking off evidence of rigor.
		M4_P-01
		Looking for Evidence of Student Engagement in the Key Shifts

 Slide 16 Time Allotted: 10 minutes	***Critical Idea*** • Adults do not learn from experience, but rather from reflecting on experience. ***Step-By-Step Instructions*** • Say, ○ "It is essential that we take a deliberate pause in our work to reflect on this experience." • Display the reflection questions and ask participants to turn over handout **M4_P-01 Looking for Evidence of Student Engagement in the Key Shifts**, and individually reflect on these questions for a few minutes. • Ask participants to make eye contact with someone in the room who they haven't worked with thus far, then share their reflection with that person. • Solicit comments from the group for each reflection question. ***Words of Wisdom*** • Don't rush this conversation. Participants need time to think about, reflect on, and share their observations of what they saw in the lesson. • Remember to focus conversations on how the key shifts enable students to engage in mathematics in meaningful ways, which can lead to a deeper understanding of math as students develop mathematical thinking and perseverance. • At some point there may be a discussion about the specific models used in EngageNY. It is crucial that teachers understand that in most cases, these models are not dictated by the standards. EngageNY does a good job of creating coherence across grade levels using their specific models, but that does not mean that the models themselves are a requirement of the standards. Teachers need to be flexible with the models used so that they can best meet students' needs.	**M4_P-01** Looking for Evidence of Student Engagement in the Key Shifts

Math Module 4, Session 2
Session Title: Exploring Coherence in the LSSM

Session Overview *What are the overarching goals of this session? Why are those goals important?* *How do they connect to what's come before and what will come after?*
The overarching goal of Session 2 is for participants to understand their specific grade level's place in the larger picture of *A Story of Units*. Teachers will explore coherence along the K–5 continuum—focusing on the big idea of building conceptual understanding of the base-ten system and its structure—by analyzing each grade level's standards and identifying when concepts are introduced, developed, changed, or become more complex as they progress through the grades.

Session Key Points *What are the 2 to 4* most *important takeaways from this session?*	**Session Products** *What will participants produce during the session? Immediately following the session?*
Through Session 2, participants will know: • Each grade builds on the prior work in the grades before and is the foundation of work to come in future grades, illustrating the coherence of the standards. • Studying the standards in a vertical team is necessary to understand how specific grade-level expectations fit into the development of a big idea across grades, which has implications for grade-level teaching.	• During Session 2, participants will produce a vertical alignment chart for the big idea of building conceptual understanding of the base-ten system and its structure. • Participants will discuss how the standards change from grade to grade, and they will identify the implications for instruction as a result of their study of the standards.

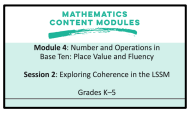
Session Objectives *What will participants know, believe, and be able to do as a result of this session?*	**Session Agenda at a Glance** *What is the overall flow of this session?*
Participants will… • Engage in a study of the standards across grades K–5 related to building conceptual understanding of the base-ten system and its structure to see how this idea develops across the grades. (CK) • Revise and refine their thinking on what the big idea means. (CK) • Reflect on their study of the standards and how their instruction may be affected by their new knowledge. (CP) CK: Content Knowledge CP: Content Pedagogy CS: Curriculum Skills	• Explore the big idea of building conceptual understanding of the base-ten system and its structure. • Align standards based on what students should know and be able to do. • Identify changes in skills, expectations, and understandings in the standards from one grade to the next. • Reflect on how a study of vertical alignment helps with their understanding of the key shifts.

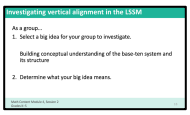
Facilitation Recommendations	
Session Length	60 minutes

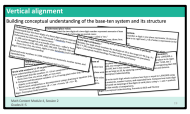
Preparing to Facilitate *What materials and supplies are needed to facilitate this session?* *What must the facilitator do to prep for the actual session?*	

Session Materials
 	
○ **Participant Handouts**
  ○ **M4_P-03** Vertical Alignment Chart
  ○ **M4_CL-05** Standards Cards for Vertical Alignment (cut out prior to session, 1 set per group of 4)
 	
○ **Additional Supplies**
  ○ Chart paper (1 sheet for every 4 participants)
  ○ Markers
  ○ Tape
  ○ Sticky notes
	Facilitator Pre-Work and Prep
	
	○ Print and cut out handout **M4_CL-05** Standards Cards for Vertical Alignment, 1 set of cards for each group of 4 participants
	• Print participant handouts (1 set of handouts per participant)

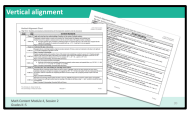
Participant Pre-Work *What should participants bring to this session? What should they do or prepare in advance of this session?*	
Participants must bring: • Not applicable	**Before this session, participants should:** • Not applicable

Time & Slide Thumbnail	Facilitator Notes Session 2: Exploring Coherence in the LSSM	Materials
 Slide 17 Time Allotted: < 1 minute	**Session 2: Exploring Coherence in the LSSM** **Slides 17–22 Time Allotted: 60 minutes** ***Critical Idea*** • This slide introduces Session 2. ***Step-By-Step Instructions*** • Tell participants that we will transition into Session 2. ***Words of Wisdom*** • For Session 2, participants should be sitting in mixed-grade-level groups of four.	


 	
Slide 18
Time Allotted:
10 minutes
	Critical Idea
	• The power of the Vertical Alignment process and tool is the collaborative conversation. It is not about just filling out the chart. The purpose of the chart is to capture common understandings that result from the collaborative conversations.
	
	Step-By-Step Instructions
	• Say,
	  ○ "We are going to engage in a process that enables us to investigate vertical alignment in the LSSM."
	  ○ "This vertical alignment process is designed to be used a few times a year, preferably with a group of K–5, K–8, or K–12 educators, in order to study standards that relate to a *big idea.*"
	  ○ "This process is NOT intended to be a 'divide and conquer' activity. The power of this process is in the collaborative conversations that lead to a common understanding of how a big idea develops over time across a number of grade levels."
	• **<u>Animate Step 1 and Step 2</u>.**
	• Say,
	  ○ "With that in mind, let's revisit the first two steps of this process on the slide." *(**Note:** Participants should complete Step 1 and Step 2 before getting the materials they will need to complete the vertical alignment.)*
	• **<u>Step 1</u>:**
	• Say,
	  ○ "The instructions say to select a big idea, but today I am selecting the big idea for this activity so we can work on this module's focus domain—Numbers and Base-Ten."
	  ○ "A *big idea* is a concept that takes time to develop across grade levels, yet is narrow enough to support a focused conversation involving just a few standards at each grade level."
	  ○ "The big idea we will be studying is **Building conceptual understanding of the base ten system and its structure.**"
	• **<u>Step 2</u>:**
	• Say,
	  ○ "Work with your small groups to determine the meaning of the big idea."
	  ○ "To determine what the big idea means, discuss
	  - "what conceptual understanding of place value entails,
	  - "how conceptual understanding is developed, and
	  - "what foundational math concepts support the development of place value understanding."
	  ○ "That is, discuss what do students need to know to truly understand place value at
		M4_CL-05
		Standards Cards for Vertical Alignment

Time & Slide Thumbnail	Facilitator Notes Session 2: Exploring Coherence in the LSSM	Materials
	a conceptual level? This is an important foundation for procedural skills and fluency with operations, which develop AFTER conceptual understanding." ○ "Think in terms of what students need to know and be able to do to demonstrate understanding and proficiency." • Give a few minutes for participants to discuss the meaning of the big idea with their groups. Then ask a few groups to share their thinking. • As participants work, distribute the standards strips from handout **M4_CL-05 Standards Cards for Vertical Alignment:** one set of standards strips per group. (These should have been printed and cut out prior to the session.) ***Words of Wisdom*** • **Do not let groups divide and conquer**. Groups need to work together through each step for the standard(s) for each grade level.	
 Slide 19 Time Allotted: 15 minutes	***Critical Idea*** • The power of this activity is the collaborative conversation about carefully selected standards connected to a big idea. ***Step-By-Step Instructions*** • Explain the vertical alignment process. • Say, ○ "When discussing the vertical alignment of an idea across grade levels, you need to study the standards from each grade level that are related to the big idea and then discuss how the idea develops and changes." ○ "You do not necessarily need to study every standard at each grade level that relates to the big idea." ○ "For our work today, we have chosen the standards for you. Each group has a set of the selected (cut out) standards. Each standard strip has the actual language of one or more of the standards from kindergarten through Grade 6." ○ "When you look at your standards strips, you will notice that the grade-level standard coding has been removed. ○ "For the first part of this activity, you will read each of the standard strips with your table group and determine—based on your experiences and how your group thinks the big idea develops—the order of the standards, from kindergarten to Grade 6." • As participants read and discuss the standards statements, ask them to think about how the language describes skills increasing in complexity and how the language of the standards affects their group's placement of the cards. • Give groups 10 minutes to work together to sequence their standards strips and think about the question "How did the language of the standards affect your group's placement of the standards strips?" • As groups are working, walk around and give each group one sheet of chart paper, chart markers, and a long strip of tape, 1 to 1.5 feet long. • When it looks like groups have completed the task, call participants back to the whole group. • Ask, ○ "How did the language of the standards help you to place the standards into a progression?" • Ask participants to share a few specific examples of language from the standards that helped them to determine their placement of the standards strips. • Transition to the next slide to reveal the actual order of the standards, from kindergarten to Grade 6.	Sets of **M4_CL-05 Standards Cards for Vertical Alignment,** cut out and placed into bags or envelopes. One set per table.

Time & Slide Thumbnail	Facilitator Notes Session 2: Exploring Coherence in the LSSM	Materials
	Words of Wisdom • Move around groups, monitoring conversations and answering questions, and prompt discussions around the mathematics in the standards.	


Slide 20
Time Allotted:
5 minutes
	Critical Idea
	• The power of this activity is the collaborative conversation about carefully selected standards connected to a big idea.
	
	Step-By-Step Instructions
	• Ask participants to locate handout **M4_P-03 Vertical Alignment Chart**. Then ask the groups to compare their sequencing of the standards to the actual order of the standards.
	• Give groups 2–3 minutes to check their standards sequence and to reorder if necessary.
	• Debrief questions to ask:
	  ○ *Were there any standards that you thought were intended for one grade level but then had to move?*
	  ○ *What language in that standard do you think makes it fit with its intended grade level?*
	
	Words of Wisdom
	• Not applicable
		M4_P-03
		Vertical Alignment Chart

Slide 21
Time Allotted:
20 minutes
	Critical Idea
	• The power of the vertical alignment process is in the collaborative conversation. It is not about just placing the standards in order or filling out the chart. The process is intended to capture the conversations and common understandings.
	
	Step-By-Step Instructions
	• At this point, explain the remainder of the vertical alignment process.
	• Say,
	  ○ "Please tape your strips to your chart paper, in sequential order beginning with kindergarten at the bottom."
	  ○ "Write the title of the big idea at the top of your chart paper, and note the standard coding for each strip on the left."
	  ○ "When you discuss the changes that occur from grade to grade, please chart your conversation on the right-hand side of the chart paper."
	• Participants should use the guiding questions on this slide to
	  ○ discuss the changes that occur from one grade to the next,
	  ○ determine where concepts are introduced, developed and finalized, and
	  ○ describe where and how ideas get more complex.
	• Give 15 minutes for groups to create their charts and to document the changes from grade to grade, using the questions on the slide as a guide.
	  ○ If you find that groups are struggling, you may choose to model for the whole group the changes from kindergarten to Grade 1.
	• Circulate around the room as groups are working, encouraging them to use the guiding questions to focus their conversations.
	• When groups finish their work, ask them to hang their poster.
	• If there is time, ask table groups to share a few of their findings with the whole group. Some prompts may include:
	  ○ "What are some of the important findings your group made?"
	  ○ "Was there anything that surprised you about the standards?"
		M4_P-03
		Vertical Alignment Chart

Time & Slide Thumbnail	Facilitator Notes Session 2: Exploring Coherence in the LSSM	Materials
	○ "Was there anything that was an ah-ha for you or your group?" ***Words of Wisdom*** • The purpose of the vertical alignment process is to capture conversations and ideas around focus and coherence. It is not about completing a chart!	
  Slide 22 Time Allotted: 10 minutes	***Critical Idea*** • Adults do not learn from experience but rather from reflecting on experience. ***Step-By-Step Instructions*** • Remind the group that it is essential that we take a deliberate pause in our work to reflect on this experience. • Display the reflection questions and ask participants to take a minute and individually reflect on these questions, then write a few notes on a scrap piece of paper or a sticky note. • After their individual reflection, ask participants discuss their answers at their table groups. • Call on participants to share something they heard a colleague say for each of the questions. • Close out this session by asking participants what happens if a teacher decides not to teach the standards? Popcorn some responses. • Possible response: ○ *The power of understanding the coherence of the standards is that teachers can remediate gaps in student learning that may directly influence the current content being taught as opposed to spending more time on the new learning than is necessary.* ***Words of Wisdom*** • Not applicable	Sticky notes

Math Module 4, Session 3
Session Title: Deepening Mathematical Content Knowledge for Effective Instruction

Session Overview *What are the overarching goals of this session? Why are those goals important?* *How do they connect to what's come before and what will come after?*
The overarching goal of Session 3 is for participants to do a deep study of *procedural fluency*. Participants will identify the standards that call out the required fluencies for each grade level, and they will explore related standards for developing conceptual understanding related to each required fluency. Participants will explore the process of achieving procedural fluency and relate it to the standard algorithm as called out by the standards. Finally, participants will take a closer look at the fluency section in the EngageNY lessons and determine the purpose of these sections.

Session Key Points *What are the 2 to 4* most *important takeaways from this session?*	**Session Products** *What will participants produce during the session? Immediately following the session?*
Through Session 3, participants will know: • Procedural fluency is the ability to apply procedures accurately, efficiently, and flexibly; to transfer procedures to different problems and contexts; to build or modify procedures from other procedures; and to recognize when one strategy or procedure is more appropriate to apply than another. • Direct modeling is a developmental step that involves students using manipulatives or drawings along with counting to directly represent the meaning of an operations problem or story problem. • The focus of teaching standard algorithms should *not* be as a memorized series of steps, but as making sense of the procedure as a process.	• In Session 3, participants will generate a list of standards that call out the required fluencies for each grade level.

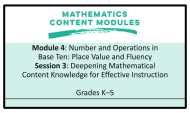
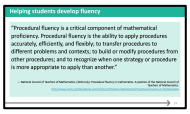
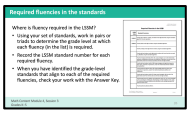
Session Objectives *What will participants know, believe, and be able to do as a result of this session?*	**Session Agenda at a Glance** *What is the overall flow of this session?*
Participants will … • Develop and use a common understanding of grade level standards to align teaching and learning. (CK, CS) • Engage in mathematics learning experiences that help clarify math concepts related to place value and fluency. (CK, CP, CS) CK: Content Knowledge CP: Content Pedagogy CS: Curriculum Skills	• Identify required fluencies for each grade level. • Connect fluency standards to conceptual understanding developed in previous grades. • Explore the process of procedural fluency. • Determine the purpose of a standard algorithm and where it falls in the K–12 math program. • Explore the fluency section of the EngageNY curriculum.

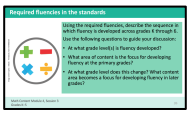
Facilitation Recommendations	
Session Length	60 minutes

Preparing to Facilitate *What materials and supplies are needed to facilitate this session?* *What must the facilitator do to prep for the actual session?*	

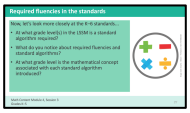
Session Materials
 	
○ **Participant Handouts**
  ○ **M4_P-04** Required Fluencies
  ○ **M4_CL-06** Required Fluencies Answer Key
 	
○ **Additional Supplies**
  ○ Sticky notes
	Facilitator Pre-Work and Prep
	
	• Print participant handouts (1 per participant)

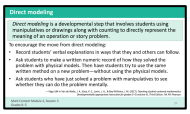
Participant Pre-Work *What should participants bring to this session? What should they do or prepare in advance of this session?*	
Participants must bring: ○ Not applicable	**Before this session, participants should:** ○ Not applicable

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials
 Slide 23 Time Allotted: < 1 minute	**Session 3: Deepening Mathematical Content Knowledge** for effective instruction **Slides 23–41 Time Allotted: 80 minutes** ***Critical Idea*** • This slide introduces Session 3. ***Step-by-Step Instructions*** • Say, ○ "We will now transition into Session 3. This session is designed for to deepen your own mathematical knowledge for effective instruction." ○ "So the activities in this session are not necessarily designed for student use. The EngageNY curriculum has similar math learning activities built into its lessons, though the activities may be spread across several lessons and not necessarily be presented in the same way we are about to experience." ○ "It is important to keep in mind that you may experience some ah-ha moments in this section that will not come as quickly and as easily to your students, so when you are teaching, it is essential that you abide by the pacing of the EngageNY curriculum, which is designed to be more developmentally appropriate for the students." ***Words of Wisdom*** • For Session 3, participants should be sitting in mixed-grade-level groups of four.	
 Slide 24 Time Allotted: 1 minute	***Critical Idea*** • Educators must have a common understanding of procedural fluency and how they can help students develop fluency. ***Step-By-Step Instructions*** • Say: ○ "Take a few moments to read the quotation on the slide." ○ "As we move into this session on procedural fluency in mathematics, it is important that we begin with a definition of *fluency*." ○ "This definition lays a foundation for building a common understanding of procedural fluency and how it is developed." ○ "In addition, it is important that we as educators recognize that we play an important role in creating a learning environment that is conducive to flexible thinking and risk-taking." ***Words of Wisdom*** • This slide is designed to lay the foundation for building a common understanding of fluency and our role as educators in helping students develop fluency.	
 Slide 25 Time Allotted: 7 minutes	***Critical Idea*** • Fluency builds over time across multiple grade levels. This understanding has important implications for teaching and learning. ***Step-By-Step Instructions*** • Ask participants to locate the following: ○ The Louisiana Student Standards for Mathematics (on their computers). ○ **M4_P-04 Required Fluencies in the LSSM**. • Say: ○ "Participant handout **M4_P-04 Required Fluencies in the LSSM** lists summaries for each of the fluencies that are required in the LSSM for grades K–6."	Computers—to access the Louisiana Student Standards for Mathematics **M4_P-04** Required Fluencies in the LSSM

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials
	○ "Notice that the handout has the Grade 6 standard codes filled in for you." ○ "Working with an elbow partner, read the standard summary for each fluency on the handout, then locate the standard in the LSSM that calls out each fluency." ○ "Then record on your handout the standard number for each fluency." ○ "You and your partner will have about 5 minutes to work, then you will have an opportunity to check your work with the whole group." • Allow 5 minutes for pairs to work. • If you notice participants struggling to find the fluency standards after the first few minutes, direct them to focus in on the NBT and OA domains. • **<u>Animate the Required Fluencies Answer Key</u>.** • Give participants a minute or two to compare their findings to the standards in the answer key on the slide. • Have them add any standards needed to their handouts. Then move to the next slide. ***Words of Wisdom*** The standard codes for the required fluencies can be found on **M4_CL-06 Required Fluencies in the LSSM: Answer Key.**	**M4_CL-06** Required Fluencies in the LSSM: Answer Key
 Slide 26 Time Allotted*:* 5 minutes	***Critical Idea*** • Fluency builds over time across multiple grade levels. This understanding has important implications for teaching and learning. ***Step-By-Step Instructions*** • Say: ○ "Now, using the required fluencies on your handout, work with your group to describe the sequence in which fluency is developed." ○ "Use the questions on the slide to guide your discussion." ○ "Be prepared to share your findings." • Give groups 2 to 3 minutes to discuss, and then ask them to share what they discovered about the development of fluency from kindergarten to Grade 6. • Possible responses include: ○ *Addition and subtraction are the focus in the primary grades (K–2).* ○ *Multiplication and division begins in Grade 3.* ○ *Fluency for addition/subtraction starts in kindergarten with fluency within 5. Then the number range increases each year up to Grade 4.* ○ *Fluency for whole-number multiplication occurs in Grade 5.* ○ *Fluency for division of whole numbers is in Grade 6, along with all decimal operations.* ***Words of Wisdom*** • The purpose of this conversation is to describe the sequence of the required fluencies and to determine the focus for the primary and intermediate grade levels. Keep the small-group and whole-group discussions focused on these ideas. You will expand on these ideas on the next slide.	**M4_P-04** Required Fluencies in the LSSM

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials

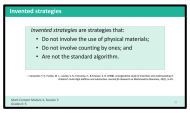

 	
Slide 27
Time Allotted*:*
7 minutes
	Critical Idea
	• Fluency builds over time across multiple grade levels, and the focus is NOT on standard algorithms. This understanding has important implications for teaching and learning.
	
	Step-By-Step Instructions
	• Say:
	  ○ "Now I would like for you and your group to take a closer look at the standards."
	  ○ "Take a few moments to read the questions on the slide."
	  ○ "With your group, look through the K–6 standards and determine the following:
	  – "At what grade levels are standard algorithms required in the LSSM?"
	  – "What do you notice about required fluencies and standard algorithms?"
	  – "At what grade level is the math concept (or concepts) associated with each standard algorithm introduced?"
	• Give participants 4–5 minutes to work with their groups, then ask them to share their answers to the questions on the slide.
	• Possible responses include:
	  ○ *Standard algorithms are required in grades 4, 5, and 6.*
	  – ***4.NBT.B.4*** *Fluently add and subtract multi-digit whole numbers with sums less than or equal to 1,000,000, using the standard algorithm.*
	  – ***5.NBT.B.5*** *Fluently multiply multi-digit whole numbers using the standard algorithm.*
	  – ***6.NS.B.2*** *Fluently divide multi-digit numbers using the standard algorithm.*
	  – ***6.NS.B.3*** *Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm, for each operation.*
	  ○ *Whenever the use of the standard algorithm is called out in the standards, it is associated with fluency. However, for each concept, fluency is developed in increments over time and across grade levels.*
	  ○ *Concepts are introduced as follows:*
	  – *Addition and subtraction are introduced in kindergarten, but the standard algorithms are required in Grade 4.*
	  – *Multiplication and division are first introduced in Grade 3, but the standard algorithm for multiplication is required in Grade 5 and the standard algorithm for division is required in Grade 6.*
	• Summarize by saying, "The standards allow for fluency to develop in increments and over multiple grade levels, and the focus is not on the standard algorithm."
	
	Words of Wisdom
	• Not applicable
		Computers—to access the Louisiana Student Standards for Mathematics
		
		M4_P-04
		Required Fluencies

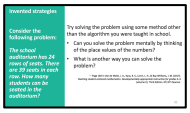
Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials
 Slide 28 Time Allotted*:* 1 minute	***Critical Idea*** • Developing fluency is a multistage process that builds over time across multiple grade levels. ***Step-By-Step Instructions*** • Say: ○ "Developing fluency involves three steps or stages: – Direct Modeling – Invented Strategies – Standard Algorithms" ○ "Each step or stage is important if we want students who can: – Apply procedures accurately, efficiently, and flexibly; – Transfer procedures to different problems and contexts; – Build or modify procedures from other procedures; and – Recognize when one strategy or procedure is more appropriate to apply than another." ***Words of Wisdom*** • This slide is a quick tell.	
 Slide 29 Time Allotted*:* 3 minutes	***Critical Idea*** • ***Direct modeling*** is the first stage in developing fluency. It is a developmental step that students must have opportunities to experience, and therefore should not be skipped or rushed. ***Step-By-Step Instructions*** • Say: ○ "The first stage in developing fluency is **direct modeling**." ○ "By "direct modeling," we do NOT mean the teacher directly modeling strategies." • **<u>Animate the text box</u>**. ○ "*Direct modeling* is a developmental step that involves students using manipulatives or drawings along with counting to directly represent the meaning of an operation or story problem." ○ "Whenever students first attempt to conceptually understand a new math concept, they begin with direct modeling." ○ "Because this stage is developmental, it cannot and should not be skipped or rushed—but there are ways to help students move beyond direct modeling." • **<u>Animate the remaining text on the slide</u>**. ○ "Teachers can…" – "Record students' verbal explanations in ways that they and others can follow." – "Ask students to make a written numeric record of how they solved the problem with physical models. Then have students try to use the same written method on a new problem without the physical models." – "Ask students who have just solved a problem with manipulatives to see whether they can now do the problem mentally." ○ "Of course, teachers will need to make careful observations of students as they work to determine when students are developmentally ready to begin moving away from direct modeling." ○ "Let's watch a short video to look for evidence of students using direct modeling and to see how the teacher in the classroom uses strategies to encourage	

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials
	students to move from direct modeling." ***Words of Wisdom*** • Share this information quickly, but make sure participants understand the key point: **Direct modeling is the first step in developing fluency.** It is a developmental step that students must have opportunities to experience, so it must not be rushed.	

Slide 30
Time Allotted:
12 minutes
	Critical Idea
	• *Direct modeling* is the first stage in developing fluency. It is a developmental step that students must have opportunities to experience, and therefore should not be skipped or rushed.
	
	Step-By-Step Instructions
	• Say:
	  ○ "We are going to observe a Grade 3 classroom in a video."
	  ○ "The students in this classroom have been introduced to the concept of 3-digit subtraction, and they are in the process of developing a conceptual understanding of this concept."
	• **<u>Animate the slide</u>**.
	  ○ "As you watch the video, use these questions to guide your observations."
	  – "How is the teacher helping students to move from direct modeling of three-digit subtraction?"
	  – "What evidence indicates that students have already moved past direct modeling with other math concepts? How do you know?"
	• Encourage participants to take notes—recording what the teacher and students are doing and saying as they work together on 3-digit subtraction.
	• Play the video (it's about 8 minutes long).
	• After participants watch the video, give them a few minutes to discuss the questions with their small groups.
	• Have a few groups share their observations, focusing on
	  ○ Strategies that the teacher used to help students move from direct modeling; and
	  ○ Evidence of concepts that students no longer need to use direct modeling for.
	• Transition to the next slide by saying, "After Direct Modeling, the next step or stage in the development of fluency is ***Invented Strategies***."
	
	Words of Wisdom
	• Try not to explain too much about the video before showing it. The questions on this slide require participants to look for evidence of direct modeling by students and the teacher's use of strategies to begin to help students move beyond direct modeling and into invented strategies.
		Citation: Video is from EngageNY: Grade 2 Math: Use Modeling and Tools to Solve Three Digit Subtraction Problems 2.NBT.7. (About 8 minutes long). *https://www.engageny.org/resource/common-core-instruction-use-modeling-and-tools-to-solve-three-digit-subtraction-problems*

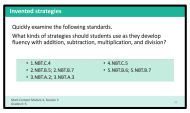
Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials

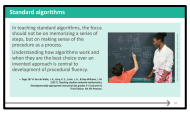
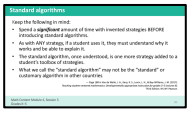

 	
Slide 31
Time Allotted:
1 minute
	Critical Idea
	• Using ***invented strategies*** is the second stage in developing fluency. Invented strategies are those that do not involve the use of physical materials, do not involve counting by ones, and are not the standard algorithm.
	
	Step-By-Step Instructions
	• Say:
	  ○ "The phrase *invented strategies* does not mean that teachers are inventing strategies for students to use."
	  ○ "*Invented strategies* is a phrase used in the research to refer to strategies that…
	  – Do not involve the use physical materials;
	  – Do not involve counting by ones; and
	  – Are not the standard algorithm."
	  ○ "Let's engage in a couple of quick examples that require invented strategies."
	
	Words of Wisdom
	• This is a quick tell.	


 	
Slide 32
Time Allotted:
4 minutes
	Critical Idea
	• Using *invented strategies* is the second stage in developing fluency. Invented strategies are those that do not involve the use of physical materials, do not involve counting by ones, and are not the standard algorithm.
	
	Step-By-Step Instructions
	• Say:
	  ○ "Consider this problem: The school auditorium has 24 rows of seats. There are 39 seats in each row. How many students can be seated in the auditorium?"
	• **<u>Animate the text on the right side of the slide</u>**.
	• Say:
	  ○ "Try solving the problem using a method other than the standard algorithm."
	  ○ "If you want to start by multiplying 9 and 4, try a different approach."
	  ○ "As you work, use the questions on the slide to guide you."
	  ○ "In addition, be prepared to share your strategy or strategies."
	• Give participants a minute to solve the problem, then say,
	  ○ "Turn to an elbow partner and share your invented strategy for solving the problem."
	• Give participants a minute or two to share their strategies, then ask for a few volunteers to share their strategies with the whole group.
	
	Words of Wisdom
	• Examples of ways students solved the problem using invented strategies:
	  ○ "24 is close to 25, and 25 x 4 equals 100, so 25 x 39 is 25 less than 25 x 40 or 1,000 (975), and because I rounded 24 up, the answer is 39 less or 936."
	  ○ "39 is close to 40, and if I multiply 20 rows by 40 seats, that equals 800. Then I have 4 more rows for 160 more seats. That's 960. Then I have to take 24 away to fix the bump up to 40 from 39, so the answer is 936."
	  ○ "20 x 30 equals 600, 20 x 9 equals 180, so together that equals 780. Then 30 x 4 equals 120, so that's 900. And 9 x 4 equals 36 more, so the answer is 936."
		Citation *for problem and student responses: Van de Walle, J., Karp, K., Lovin, L., & Bay-Williams, J. (2018). Teaching student-centered mathematics. Developmentally appropriate instruction for grades 3-5. New York: Pearson. p. 183.*

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials

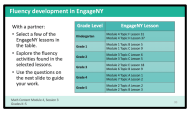
Slide 33
Time Allotted*:*
3 minutes
	Critical Idea
	• Using ***invented strategies*** is the second step in developing fluency. Invented strategies are those that do not involve the use of physical materials, do not involve counting by ones, and are not the standard algorithm.
	
	Step-By-Step Instructions
	• Say:
	  ○ "Now try this computation."
	• **<u>Animate the text on the right side of the slide</u>**.
	• Say:
	  ○ "For this one, try this method: Begin by adding the hundreds, saying the totals as you go—*3 hundred, 4 hundred, 8 hundred*.
	  ○ "Then add on to this the tens, successively, and, finally, the ones."
	• Give participants a few moments to determine the total.
	• **<u>Animate the questions on the slide</u>**.
	• Give participants a few moments to reflect quietly on the questions. Then ask if anyone would like to share their thinking.
	• Summarize the conversation by saying:
	  ○ "Initially, when students move from direct modeling to invented strategies, they may require the support of mathematical tools—manipulatives or paper and pencil."
	  ○ "As students become more adept at using invented strategies, they can and should be challenged to do computations mentally."
	
	Words of Wisdom
	• Not applicable
		Citation *for the problem:*
		Van de Walle, J., Karp, K., Lovin, L., & Bay-Williams, J. (2018). Teaching student-centered mathematics. Developmentally appropriate instruction for grades 3-5. New York: Pearson. P. 183.

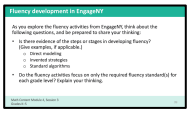

Slide 34
Time Allotted*:*
10 minutes
	Critical Idea
	• The standards can give educators insights into strategies that students can and should use to move toward fluency.
	
	Step-By-Step Instructions
	• Say:
	  ○ "When developing a common understanding of fluency, it is important for educators to examine the standards. The standards can give educators insights into strategies that students can and should use to move toward fluency."
	  ○ "So, how do the standards describe invented strategies? What insights can we glean about invented strategies that are important in developing fluency?"
	• **<u>Animate the slide</u>**.
	• Say:
	  ○ "With your group, examine the standards listed on the slide."
	  ○ "As you do, look for examples of the types of invented strategies that students should use as they develop fluency."
	• Give groups about 5 minutes to examine the standards.
	• Remind participants to select someone in their group to document their findings.
	• If groups are having difficulty with the task, tell them to look for commonalities among the standards listed.
	• After groups have had 5 minutes to work, ask them to share some of the types of invented strategies called out in the standards.
	• Record the invented strategies on chart paper as groups share.
	• The types of strategies that should surface include:
	  ○ Models and pictures
		Computers—to access the Louisiana Student Standards for Mathematics

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials
	○ Strategies (and algorithms) based on place value ○ Strategies (and algorithms) based on properties of operations ○ Strategies (and algorithms) based on the relationship between addition and subtraction or the relationship between multiplication and division ○ Mental computation • Transition to the next slide by saying, ○ "As students become increasingly adept at using a variety of invented strategies, including mental computation, they move toward readiness for learning the standard algorithms for addition, subtraction, multiplication, and division." ***Words of Wisdom*** • Participants should not spend time deeply studying the standards and critical areas. They should quickly examine the sections in the standards, looking for the types of strategies	
 Slide 35 Time Allotted*:* 1 minute	***Critical Idea*** • Understanding how algorithms work and when an algorithm is the best choice over an invented approach is central to development of procedural fluency. ***Step-By-Step Instructions*** • Ask participants to take a moment to read the quotation on the slide. • Say: ○ "The third stage in the development of fluency is *Standard Algorithms*." ○ "As with *direct modeling* and *invented strategies*, students must be able to make sense of how standard algorithms work. Students also must understand when standard algorithms are the best choice over an invented strategy for solving a problem." ***Words of Wisdom*** • This slide is a quick transition.	
 Slide 36 Time Allotted*:* 3 minutes	***Critical Idea*** • Understanding how algorithms work and when an algorithm is the best choice over an invented approach is central to development of procedural fluency. ***Step-By-Step Instructions*** • Say: ○ "When moving into this third stage in the development of fluency, there are some things that educators should keep in mind." • **<u>Animate the first bullet</u>**. • Say: ○ "Students are unlikely to invent standard algorithms." ○ "You will need to introduce and explain standard algorithms, and help students understand how and why algorithms work." ○ "No matter how carefully you introduce any standard algorithm, students are likely to sense that this is the 'right' way. So, first **spend a significant amount of time with invented strategies before introducing standard algorithms**." ○ "Remember, the standards require that students learn a variety of strategies based on place value and properties of operations two or more years before fluency with standard algorithms is expected." ○ "The understanding that students gain from working with invented strategies will make it easier for you to meaningfully teach the standard algorithms." • **<u>Animate the second bullet</u>**.	***Citation*** *for quotation on the slide and the information in the facilitator notes:* *Van de Walle, J. A., Karp, K., S., Lovin, L. H., Bay-Williams, J. M. (2017). Teaching Student-Centered Mathematics: Developmentally appropriate instruction for grades 3–5 (volume II). Third Edition. NY, NY: Pearson, p. 188.*

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials
	○ "Apply the same rule to standard algorithms as to all strategies: **If a student uses it, they must understand why it works and be able to explain it.** Students can profit from making sense of standard algorithms just as they should be able to reason about other approaches. But the responsibility for explanations should be theirs, not yours." • **Animate the third bullet**. ○ "Standard algorithms are a significant part of the development of deep understanding of mathematics, AND, just as with other strategies, standard algorithms may be more useful in some instances than in others. Therefore, **the standard algorithm, once understood, is one more strategy added to a student's toolbox of strategies**." • **Animate the last bullet**. ○ "The expression of mathematics and mathematical thinking is not necessarily 'universal.' **What U.S. teachers call the 'standard algorithm' may not be customary in other countries**. There are many international differences in notations, conventions, and algorithms." ○ "Knowing more about the diverse algorithms students might bring to the classroom—and valuing their experiences—will help you support students and respond to families." ○ "Developing Fluency INCLUDES understanding how standard algorithms work and when it is appropriate to use them." ***Words of Wisdom*** • Not applicable	
 Slide 37 Time Allotted: 1 minute	***Critical Idea*** • Evidence of each step in the development of fluency can be found throughout the EngageNY lessons in K–5. ***Step-By-Step Instructions*** • Say: ○ "Now that we understand the three steps or stages in the development of fluency, let's consider how our EngageNY resource develops fluency. ○ "In EngageNY, fluency is developed at each grade level." ○ "Fluency is the first section in every lesson, and each lesson is designed to promote fluency using both invented strategies and standard algorithms." ○ "The fluency portion of each lesson includes activities such as: – Sprints – Math Finger Flash – Number Disk Dash – Games – Personal Whiteboard Activities ***Words of Wisdom*** • This slide is a quick tell.	

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials


Slide 38
Time Allotted*:*
1 minute
	Critical Idea
	• Fluency development is evident in every EngageNY lesson.
	
	Step-By-Step Instructions
	• Say:
	  ○ "Let's take a few minutes to examine the fluency activities found in a few select EngageNY lessons"
	  ○ "Notice the chart on the slide lists two EngageNY lessons for each grade level, kindergarten through Grade 5."
	  ○ "With a partner, first select a few of the EngageNY lessons in the table on the slide. You will have time to look at only a few lessons, so be strategic in your selection."
	• Move to the next slide to finish giving directions for this task.
	
	Words of Wisdom
	• You as facilitator might want to suggest that the members of each table group examine fluency activities from different grade level lessons listed on the slide.
		Computers—to access EngageNY lessons


Slide 39
Time Allotted*:*
12 minutes
	Critical Idea
	• Evidence of each stage in the development of fluency can be found throughout the EngageNY lessons in K–5.
	
	Step-By-Step Instructions
	• Tell participants,
	  ○ "Use your computer to access the selected EngageNY lessons, and explore the Fluency activities found in those lessons. As you explore, think about the questions on the slide, and be prepared to share your findings."
	• Give participants a few moments to read the questions.
	• Ask if participants have any questions about the task, and provide clarification if needed.
	• Tell participants they have about 10 minutes to explore, so they need to stay focused on the fluency section of each lesson and use the questions to guide their work.
	• Set participants to task.
	• After giving participants 10 minutes to work, bring them back to whole group, and ask volunteers to share what they found in the Fluency sections of the lessons they were able to explore.
	• As participants listen to what was found across the grade levels, the group should discover the following:
	  ○ Examples of all three stages in developing fluency are evident in EngageNY lessons, and
	  ○ The fluency activities in a given grade level focus on the required fluency (or fluencies) for that grade level, and they also support the development of required fluencies at other grade levels.
	
	Words of Wisdom
	• You as facilitator might want to suggest that the members of each table group examine fluency activities from different grade-level lessons listed on the slide.
		Computers—to access EngageNY lessons

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials

Slide 40
Time Allotted:
1 minute
	Critical Idea
	• When developing fluency, our goal is for students to become independent learners who can compute multidigit addition, subtraction, multiplication, and division problems in a variety of ways, complete written records of their work, explain their thinking, and discuss merits of one strategy over another.
	
	Step-By-Step Instructions
	• Say,
	  ○ "Take a moment to read the quotation on the slide."
	  ○ "In our schools and across our school systems, the ultimate goal is for students to become independent learners of mathematics."
	  ○ "This goal means that our students should be able to compute multidigit addition, subtraction, multiplication, and division problems in a variety of ways, complete written records of their work, explain their thinking, and discuss merits of one strategy over another."
	
	Words of Wisdom
	• This is a quick transition to the final reflection for this session.	

Slide 41
Time Allotted:
7 minutes
	Critical Idea
	• The development of fluency across the LSSM reflects the key shift of rigor.
	
	Step-By-Step Instructions
	• Say:
	  ○ "It is important for us to take time to reflect on what we have learned."
	  ○ "Taking time to reflect helps us make sense of what we have learned and find ways to apply the new learning to our own work."
	• **<u>Animate the first text box</u>.**
	  ○ "Take a moment to remind yourself about the key shift of *rigor*."
	• **<u>Animate the second text box</u>.**
	  ○ "Now think about what you have learned about *fluency*."
	  ○ "How does the development of fluency in the standards reflect the key shift of rigor?"
	  ○ "How does this relationship between fluency and rigor affect teaching and learning of mathematics in our classrooms?"
	• Give participants 2 to 3 minutes to write down their thoughts on a large sticky note.
	• Ask participants to stand up, make eye contact with another person in the room (preferably someone who is sitting with a different group), then partner up with that person.
	• Tell participants to introduce themselves to their partners, then take a quick minute or two to share their responses to the questions on the slide.
	• After 2 minutes, call participants back to the whole group, and ask volunteers to share what they discussed.
	• Some possible responses include:
	  ○ *Developing fluency always begins with building conceptual understanding of an operation, and providing time for students to use* direct modeling *and* invented strategies *as they work towards fluency.*
	  ○ *The standards are designed so that—as students learn about addition, subtraction, multiplication, and division—they are provided time to build fluency in increments and to use (apply) strategies to new contexts.*
	  ○ *In the classroom, students need time and opportunities to work with different invented strategies as they build their conceptual understanding of addition,*
		Large sticky notes

Time & Slide Thumbnail	Facilitator Notes Session 3: Deepening Mathematical Content Knowledge for Effective Instruction	Materials
	subtraction, multiplication, and division. Teachers must plan accordingly, and must look for opportunities to assess students' understanding of direct modeling, invented strategies, and the standard algorithms, when appropriate. ***Words of Wisdom*** • Not applicable	

Math Module 4, Session 4
Session Title: Instructional Strategies to Improve Curriculum Implementation

Session Overview *What are the overarching goals of this session? Why are those goals important?* *How do they connect to what's come before and what will come after?*
The overarching goal of Session 4 is for participants to continue to explore the research on orchestrating productive mathematics discussions. In this session, the participants will review the *5 Practices for Orchestrating Productive Mathematics Discussions*. The focus for this session will be mainly on practices 3 and 4—*selecting* and *sequencing* student responses. The last of the 5 practices will be covered in the next module. In this session, participants will analyze student work from the EngageNY lesson from Session 1 to identify strategies and misconceptions that participants feel should be highlighted to deepen their students' mathematical understanding. Participants will then chart their proposed sequence for these selected responses in logical order to help students make connections between them.

Session Key Points *What are the 2 to 4* most *important takeaways from this session?*	**Session Products** *What will participants produce during the session? Immediately following the session?*
Through Session 4, participants will know: • How to choose students to present because of the mathematics in their responses. • That it is important to plan in advance which types of responses to select, considering all strategies, including incorrect solutions, to illustrate a typical misconception. • It is important to purposefully order presentations so the mathematics is accessible to all students. • During anticipation of work, you should consider how possible student responses are mathematically related.	• During Session 4, participants will chart a proposed sequence of student responses to a lesson, to highlight connections that will help students deepen their mathematical understanding.

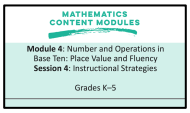
Session Objectives *What will participants know, believe, and be able to do as a result of this session?*	**Session Agenda at a Glance** *What is the overall flow of this session?*
Participants will … • Select and sequence student responses to build a mathematically coherent story line from prior knowledge to current grade level standards. (CP, CS) CK: Content Knowledge CP: Content Pedagogy CS: Curriculum Skills	• Review the "5 practices for orchestrating productive mathematics discussions." • Select and sequence student responses. • Practice selecting and sequencing student responses by analyzing student responses to a task.

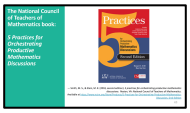
Facilitation Recommendations	
Session Length	60 minutes

Preparing to Facilitate *What materials and supplies are needed to facilitate this session?* *What must the facilitator do to prep for the actual session?*	

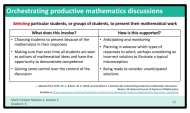
Session Materials
 	
• **Participant Handouts**
  ○ **M4_CL-07** Student Work
 	
• **Additional Supplies**
  ○ Sticky notes
	Facilitator Pre-Work and Prep
	
	• Print participant handouts (1 per participant)
	• Print one set of **M4_CL-07 Lesson 2 Exit Ticket: Student Work** for each table group

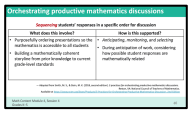
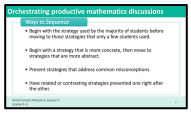
Participant Pre-Work *What should participants bring to this session? What should they do or prepare in advance of this session?*	
Participants must bring: • Not applicable	**Before this session, participants should:** • Not applicable

Time & Slide Thumbnail	Facilitator Notes Session 4: Instructional Strategies to Improve Curriculum Implementation	Materials
 Slide 42 Time Allotted: < 1 minute	**Session 4: Instructional Strategies** to improve curriculum implementation **Slides 42–49 Time Allotted: 60 minutes** ***Critical Idea*** • This slide introduces Session 4. ***Step-By-Step Instructions*** • Tell participants that we will transition into Session 4. ***Words of Wisdom*** • For Session 4, participants should be sitting in mixed-grade-level groups of four.	

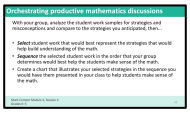

Slide 43
Time Allotted: 2 minutes
	Critical Idea
	• Emphasize to participants that the purpose of this section is to give them an overview of the model for facilitating productive mathematics discourse described in the resource *5 Practices for Orchestrating Productive Mathematics Discussions,* and to take a deeper look at the third and fourth practices: ***selecting*** and ***sequencing***. The other three practices described in this book are explored in other modules.
	
	Step-By-Step Instructions
	• Say,
	  ○ "To promote productive student discourse in the mathematics classroom, we will continue to examine the "5 practices" model as originated by Margaret Smith and Mary Kay Stein. Smith and Stein's research laid out the framework as a process for using student thinking and student work as the launch pad for rich discussions that get at the heart of important learning."
	  ○ "The first iteration of this model was done with mathematics; later, the model was expanded to also address science discourse. We will use this resource as the foundation of our learning today."
	  ○ "The purpose of this section of learning today will be to review the "5 practices" model, and to explore practices 3 and 4 in the model: ***selecting*** and ***sequencing*.**
	• Transition to the next slide.
	
	Words of Wisdom
	• The "5 practices model" is very rich; participants can become overwhelmed, so strive to keep the overview of the 5 practices brief.
		Citation:
		Smith, M. S., & Stein, M. K. (2011). *5 Practices for Orchestrating Productive Mathematics Discussions.* Reston, VA: National Council of Teachers of Mathematics. Available at http://www.nctm.org/Store/Products/5--Practices-for-Orchestrating-Productive-Mathematics-Discussions

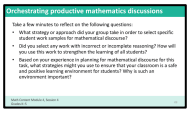
Slide 44
Time Allotted:
3 minutes
	Critical Idea
	• Emphasize to participants that the purpose of this section is to give them an overview of the model for facilitating productive mathematics discourse described in the resource *5 Practices for Orchestrating Productive Mathematics Discussions,* and to take a deeper look at the third and fourth practices: ***selecting*** and ***sequencing***. The other three practices described in this book are explored in other modules.
	
	Step-By-Step Instructions
	• Say,
	  ○ "Remember that this visual is an overview of the '5 practices model' for orchestrating productive mathematics discussions."
	  ○ "The '5 practices model' is a process of planning and instruction that teachers can implement for promoting productive discussions in classrooms."
	  ○ "The EngageNY curriculum resource makes use of these 5 practices in many lessons."	

Time & Slide Thumbnail	Facilitator Notes Session 4: Instructional Strategies to Improve Curriculum Implementation	Materials
	○ "By taking the time to understand the model, you should be able to better implement the EngageNY curriculum to its fullest intent." • **<u>Animate the slide for each step</u>.** • Briefly review the description for each step: ○ "This process depends on the foundation of establishing a clear learning goal for discussions, which often EngageNY does for you." ○ "The first practice, ***Anticipating*** **student responses** to a challenging task, is part of the planning that occurs BEFORE students engage in the mathematics task." ○ "The second practice, ***Monitoring*** **student work** during engagement with the task, happens while students are working on the task—individually, in pairs, or in small groups." ○ "The third practice, ***Selecting*** **particular student work** samples (or students, or groups of students, to present their mathematical work), happens after students have completed the task." ○ "The fourth practice, ***Sequencing*** **student work** in a specific order for discussion, also happens after students have completed the task." ○ "The fifth and final practice, ***Connecting*** **student work samples** to each other and to the key learning goal (connecting different students' responses, and connecting the responses to key mathematical ideas), happens after a sequence is determined." • **<u>Animate the slide</u>**. • Say, ○ "In the previous modules, we explored the practices of *anticipating* student responses and *monitoring* student work." • **<u>Animate the slide</u>**. ○ "The focus of our session today will be on **Selecting** particular students to present their mathematical work and **Sequencing** students' responses in a specific order for discourse." ***Words of Wisdom*** • While EngageNY does make use of many of these practices, it does not specifically call them out. So it is important that teachers using the EngageNY curriculum understand how to recognize each of these practices in order to best meet the intent of the lesson.	
 Slide 45 Time Allotted: 5 minutes	***Critical Idea*** • The practice of *selecting* is critical, because it gives the teacher control over what the whole class will discuss, ensuring that the mathematics is at the heart of the lesson. ***Step-By-Step Instructions*** • Say, ○ "Take a minute to review the slide and share your understanding of the process of ***Selecting*** with those at your table." • After giving participants time to talk with their groups, share the following with them: ○ "The third process, ***selecting*** *particular students, or groups of students, to present their mathematical work*, happens after students have completed the task." ○ "*Selecting* is supported by *anticipating* in advance possible responses, both correct and incorrect, and by *monitoring* students as they work on the task." ○ "This process involves reflection on the part of the teacher. When *selecting* students to present their work, the teacher must think about what was observed during the task, what strategies—both correct and incorrect—that individuals or groups used to complete the task, and what insights students might be able to share."	

Time & Slide Thumbnail	Facilitator Notes Session 4: Instructional Strategies to Improve Curriculum Implementation	Materials
	○ "Teachers must also recognize that over time, ALL students, including special needs students, should be provided with opportunities to share their thinking and demonstrate competence so that all students are seen as authors of mathematical ideas." • Move to the next slide. ***Words of Wisdom*** • Not applicable	
 Slide 46 Time Allotted: 5 minutes	***Critical Idea*** • The key to effective *sequencing* is to order student work in a way that makes the mathematics accessible to all students and that builds a mathematically coherent story line. ***Step-By-Step Instructions*** • Say, ○ "Take a quick minute or two to review the slide and share your understanding of the process of ***Sequencing*** with those at your table." • After giving participants time to talk with their groups, share the following with them: ○ "The fourth process, ***sequencing*** *students' responses in a specific order for discussion*, also happens after students have completed the task." ○ "Sequencing is supported by *anticipating* possible responses beforehand, *monitoring* students as they work on the task, and taking time to reflect on students' work to facilitate *selecting* those who will present their work to the class." ○ "This process involves reflection on the part of the teacher. When selecting students to present their work, the teacher must think about how to *sequence* student presentations to create a coherent story line that makes the mathematics accessible to all students and builds students' understanding of the mathematics." • Move to the next slide. ***Words of Wisdom*** • Not applicable	
 Slide 47 Time Allotted: 5 minutes	***Critical Idea*** • *Sequencing* students' responses for discussion is a critical step in developing student understanding of the mathematics. There are a number of ways teachers can sequence students' responses. ***Step-By-Step Instructions*** • Say, ○ "There are a number of ways we can sequence the presentation of student work." • Give participants a minute or two to read the information on the slide, then provide clarification, if needed. ○ "The way responses are sequenced will depend on a number of factors, such as: – The learning objective for students, – The mathematics involved, and – Students' current level of understanding." ***Words of Wisdom*** • This slide is important. Clarify that while one approach to sequencing solutions is to first present the most commonly used strategy, that approach may not always be the best for sequencing student responses.	

Time & Slide Thumbnail	Facilitator Notes Session 4: Instructional Strategies to Improve Curriculum Implementation	Materials


Slide 48
Time Allotted:
30 minutes
	Critical Idea
	• Participants will apply their knowledge of the "5 practices" to select and sequence student responses to a math task.
	
	Step-By-Step Instructions
	• Hand out student work samples (1 set per group of **M4_CL-07 Lesson 2 Exit Ticket: Student Work**).
	• Say,
	  ○ "These samples of student work are taken from students who completed the exit ticket from the fourth-grade lesson we experienced in Session 1."
	  ○ "Each sample represents a particular student's final work for this lesson."
	  ○ "You are going to take on the role of the teacher and work with your group to analyze the student work for strategies and misconceptions."
	• **Animate the slide**.
	  ○ "Then, your group will select the student work that you feel would best represent the strategies that would help build understanding of the math."
	• **Animate the slide**.
	  ○ "You will also ***Sequence*** the selected student work in the order that your group determines would best help the students make sense of the math."
	• **Animate the slide**.
	  ○ "You will then work with your group to create a chart that illustrates your selected strategies in the sequence you would have them presented in your class to help students make sense of the math."
	  ○ "As you look at these samples, remember that it is not about showcasing only the correct answers or the successful strategies. Sometimes it is just as meaningful to students' understanding to look at strategies that didn't work. There is not one correct way to sequence these strategies—just be ready to explain why your group chose to sequence them the way that you did and how that sequencing will help build student understanding."
	• Give groups time to ***Select*** and ***Sequence*** student work as they plan for mathematical discourse.
	• Have groups hang their charted strategies as they finish.
	• If there is time, ask participants to share out some of their thinking for their charts.
	
	Words of Wisdom
	• Remember that *selecting* and *sequencing* are steps 3 and 4 in the process of facilitating meaningful mathematical discourse. Before completing these steps, you would have *anticipated* student responses and *monitored* students as they worked, asking probing questions as you monitored.
		M4_CL-07
		Lesson 2 Exit Ticket: Student Work
		
		Chart paper
		
		Markers


Slide 49
Time Allotted:
10 minutes
	Critical Idea
	• Adults do not learn from experience but rather from reflecting on experience.
	
	Step-By-Step Instructions
	• Say,
	  ○ "Let's take some time to reflect on our experience in planning for mathematical discourse."
	  ○ "Take a moment to read the questions on the slide."
	• Give participants individual time to think about the questions on the slide. Encourage them to jot down their thinking on a sticky note.
	• After a few minutes, ask participants to make eye contact with someone they haven't worked with today and move to meet them in the room to share their reflections.	

Time & Slide Thumbnail	Facilitator Notes Session 4: Instructional Strategies to Improve Curriculum Implementation	Materials
	• Allow a couple minutes for participants to share. • **Animate the slide**. • Ask participants to read the third question, and give them a few moments to think individually and then share their thinking with their partner. • Ask a few participants to share what they discussed with the whole group. ***Words of Wisdom*** • This is an important conversation about the role of the classroom environment in ensuring all students openly engage in meaningful discourse. • Participants need time to think about and discuss questions like these, and they need the support that they can find from one another as they think and talk about ways to support students as they engage in meaningful discourse.	

Math Module 4, Session 5
Session Title: Purposeful Planning of the EngageNY Curriculum

Session Overview *What are the overarching goals of this session? Why are those goals important?* *How do they connect to what's come before and what will come after?*
The overarching goal of Session 5 is for participants to learn a process for collaborative planning conversations that will enable them to make connections between the standards and their resource materials. In this session, participants will review the Planning Guide—a tool for focusing conversations around the standards and making instructional decisions around their resource materials.

Session Key Points *What are the 2 to 4* most *important takeaways from this session?*	**Session Products** *What will participants produce during the session? Immediately following the session?*

Through Session 5, participants will know:
• Collaborative planning is:
  ○ Working and learning together to plan instruction (including lessons, units, assessments, and activities) focused on building the intended learnings described by the standards.
  ○ Discussing, interpreting, and refining curriculum resource materials together so as to use the materials to best meet students' needs in their learning.
• Focusing planning conversations around the standards in order to make informed instructional decisions will:
  ○ Build a shared understanding of the math content described in the standards and what that content looks like in teaching and learning.
  ○ Facilitate considering and using instructional strategies and resources that will best build on students' current understanding and connect to the intended learning.
	• After Session 5, participants should be able to produce well-informed conversations and planning notes around their standards using the Planning Guide.

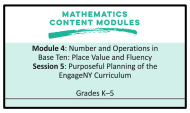
Session Objectives *What will participants know, believe, and be able to do as a result of this session?*	**Session Agenda at a Glance** *What is the overall flow of this session?*
Participants will … • Investigate select standards from the domain of Number and Operations in Base Ten to determine how place value concepts progress across K–5. (CK, CS) • Develop and use a common understanding of grade level standards to align teaching and learning. (CK, CS) CK: Content Knowledge CP: Content Pedagogy CS: Curriculum Skills	• Define collaborative planning. • Review the Planning Guide. • Practice conducting collaborative conversations around the standards.

Facilitation Recommendations	
Session Length	60 minutes

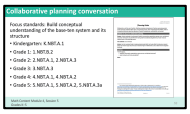
Preparing to Facilitate *What materials and supplies are needed to facilitate this session?* *What must the facilitator do to prep for the actual session?*	

Session Materials
• **Participant Handouts**
  ○ **M4_P-05** Planning Guide
• **Additional Supplies**
  ○ Sticky notes
	Facilitator Pre-Work and Prep
	• Print participant handouts (1 per participant)

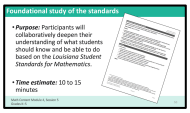
Participant Pre-Work *What should participants bring to this session? What should they do or prepare in advance of this session?*	
Participants must bring: • Computers	**Before this session, participants should:** • Not applicable

Time & Slide Thumbnail	Facilitator Notes Session 5: Purposeful Planning of the EngageNY Curriculum	Materials
 Slide 50 Time Allotted: 1 minute	**Session 5: Purposeful Planning** of the EngageNY curriculum **Slides 50–56 Time Allotted: 60 minutes** ***Critical Idea*** • This slide introduces Session 5. • We will work toward implementing structured collaboration for planning instruction. ***Step-By-Step Instructions*** • Tell participants that we will transition into Session 5. ***Words of Wisdom*** • For Session 5, participants should be sitting in grade-level groups.	

Slide 51
Time Allotted:
3 minutes
	Critical Idea
	• The Planning Guide helps grade-level teams stay focused on studying standards and planning aligned instruction together.
	
	Step-By-Step Instructions
	• Say,
	  ○ "In previous modules, we introduced you to the Planning Guide, a tool for managing regular, ongoing collaborative planning of instruction in our grade-level teams that is aligned to the standards."
	• Give each participant a copy of **M4_P-05 Planning Guide**.
	• Say,
	  ○ "Remember: this tool is designed for use in a 45-minute collaborative planning period. Your planning team can use this tool to guide your discussion and capture key information from it, keeping the team focused on understanding the content and what it looks like in instruction, and then considering the best use of strategies and resources for instruction."
	• Give participants two minutes with a partner to refamiliarize themselves with the Planning Guide.
	• Transition to the next slide.
	
	Words of Wisdom
	• This is a quick reintroduction to the Planning Guide. Do not take too much time here.
		M4_P-05
		Planning Guide

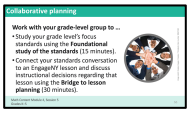

 	
Slide 52
Time Allotted:
2 minutes
	Critical Idea
	• The Planning Guide helps grade-level teams stay focused on studying standards and planning aligned instruction together.
	
	Step-By-Step Instructions
	• Say,
	  ○ "Recall that the first step in the process is to choose focus standards to study. When you are using the tool with your team, you might choose standards that are coming up in the next lesson or unit, standards that the team typically sees students struggle with, or something else. Whatever way you decide, make sure the team agrees generally to 1 to 3 standards to study."
	  ○ "Since our focus has been on the big idea "Building conceptual understanding of the base-ten system and its structure," we will use the standards from that big idea for today's discussion."
	• Have each group note the standards they will study today on the first page of their Planning Guide.
		M4_P-05
		Planning Guide

Time & Slide Thumbnail	Facilitator Notes Session 5: Purposeful Planning of the EngageNY Curriculum	Materials
	Words of Wisdom • Walk around to groups throughout this process to monitor progress, and ask questions/prompt groups to maintain progress.	


 	
Slide 53
Time Allotted:
2 minutes
	Critical Idea
	• The Planning Guide helps grade-level teams stay focused on studying standards and planning aligned instruction together.
	
	Step-By-Step Instructions
	• Say,
	  ○ "Since we guided you through this process step by step in the previous module, this time we are going to quickly review the process and then release you to do it on your own in your grade-level groups."
	  ○ "If you look at the next page of the Planning Guide, you will see the section called Foundational Study of the Standards."
	  ○ "Remember that the purpose of this section is to collaboratively deepen your understanding of what students should know and be able to do based on the standards—and that once you get used to the process, this section should only take about 15 minutes to complete."
	  ○ "The page includes a set of specific 'look-fors' to help guide you in this conversation."
	• Transition to the next slide.
	
	Words of Wisdom
	• These slides serve as a quick review of the Planning Guide.
		Computer
		
		M4_P-05
		Planning Guide

Slide 54
Time Allotted:
3 minutes
	Critical Idea
	• The Planning Guide helps grade-level teams stay focused on studying standards and planning aligned instruction together.
	
	Step-By-Step Instructions
	• Say,
	  ○ "Locate the third page of the Planning Guide. This section is called the Bridge to Lesson Planning. We did a deep dive into this section in the previous module."
	  ○ "Remember that the purpose of this section is to connect your understanding of the standards to the EngageNY resource materials."
	  ○ "You will recall that this part of the collaborative planning conversation takes the most time, about 20 to 30 minutes."
	• Transition to next slide.
	
	Words of Wisdom
	• These slides serve as a quick review of the Planning Guide.
		M4_P-05
		Planning Guide

Time & Slide Thumbnail	Facilitator Notes Session 5: Purposeful Planning of the EngageNY Curriculum	Materials


 	
Slide 55
Time Allotted:
45 minutes
	Critical Idea
	• It is important to connect our deep study of the standards to the implications for instruction to help us make informed decisions about the resource materials that we use in our classrooms.
	
	Step-By-Step Instructions
	• Say,
	  ○ "You are now going to work with your grade-level groups to work through the entire planning process laid out in the Planning Guide."
	  ○ "You will have 45 minutes to complete the whole process: 15 minutes for the study of the standards and 30 minutes for the bridge to lesson planning."
	  ○ "Remember to use all the resources available to you on the Louisiana Believes website to help you with your discussion and in choosing a lesson from EngageNY."
	  ○ "I will be walking around the entire time to make myself available if you need any help or have any questions."
	• Allow 45 minutes for participants to plan.
	
	Words of Wisdom
	• Walk around and help groups as needed.
		Computers
		
		M4_P-05
		Planning Guide

   Slide 56 Time Allotted: 5 minutes	***Critical Idea*** • It is important to connect our deep study of the standards to the implications for instruction to help us make informed decisions about the resource materials that we use in our classrooms. ***Step-By-Step Instructions*** • Say, ○ "Take a few moments to read the questions on the slide and note your individual reflections on a sticky note." • Give participants a minute or two to individually reflect and note their thinking on a sticky note. • Then give participants a few minutes to discuss the questions with those in their group. • After 3 minutes, ask participants to share out a few of their conversation points. • Summarize by reminding participants that it is our job as educators to provide students with rich learning experiences that give them opportunities to engage in meaningful mathematics and that help prepare them for college and career. • Ask participants to return to their original seats. ***Words of Wisdom*** • Don't rush this conversation—it is pivotal.	Sticky notes

Math Module 4, Session 6
Session Title: Productive Classroom Culture in the EngageNY Curriculum

Overview *What are the overarching goals of this session? Why are those goals important?* *How do they connect to what's come before and what will come after?*
Session 6 seeks to explore the question, "How do we encourage students to value struggle, failure, and perseverance in our classrooms?" The session is grounded by an Agile Mind article, "Persistence and effective effort," to enable participants to reflect on their own experiences with struggle and to connect these experiences to support students in productive ways. Participants connect the research to the curriculum by examining an EngageNY lesson for their grade level and identifying places in the lesson that support students in persistence and effective effort. In addition, participants identify ways to increase opportunities for students to persist in the EngageNY lesson. Participants walk away from Session 6 with key ideas from research and clear action steps to foster persistence and effective effort in the classroom.

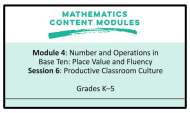
Session Key Points *What are the 2 to 4* most *important takeaways from this session?*	**Products/Deliverables** *What will participants produce during the session? Immediately following the session?*
Through Session 6, participants will know: • Adults play a significant role in helping students develop persistence and apply effective effort. • Incorporating strategies that promote students' persistence and effective effort can affect the overall culture of learning in classrooms. • The EngageNY lessons contain strategic opportunities for students to apply persistence and effective effort strategies. • Key ideas from research can inform concrete action steps to foster persistence and effective effort in the classroom.	Participants will: • Complete a text protocol for the Agile Mind article, "Persistence and effective effort."

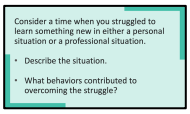
Session Objectives *What will participants know, believe, and be able to do as a result of this session?*	**Session Agenda at a Glance** *What is the overall flow of this session?*
Participants will: • Promote students' persistence and effective effort in the classroom. (CP) • Identify appropriate places in the EngageNY curriculum for students to apply persistence and effective effort strategies. (CS) CK: Content Knowledge CP: Content Pedagogy CS: Curriculum Skills	• Engage in a personal reflection—When have you experienced struggle? • Identify key findings from research and educator action steps. • Examine an EngageNY lesson to identify opportunities in the curriculum for students to apply persistence and effective effort strategies. • Engage in a session reflection—What, So What, and Now What?

Facilitation Recommendations *At what time of year should this session be delivered? To what size audience?* *Should it ideally be done in conjunction with another session?*	
Preparing to Facilitate	

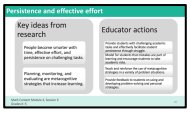
Session Materials
 	
• **Participant Handouts**
  ○ **M4_P-06 Persistence and Effective Effort**
 	
• **Additional Supplies**
  ○ Markers
  ○ Chart paper
	Facilitator Pre-work and Prep
	
	• Print participant handouts
	• Read the article **M4_P-06 Persistence and Effective Effort**

Participant Pre-Work	
Participants must bring: • Computer or mobile device with internet access	**Participants:** • Not applicable

Time & Slide Thumbnail	Facilitator Notes Session 6: Productive Classroom Culture in the EngageNY Curriculum	Materials
 Slide 57 Time Allotted: <1 minute	**Session 6: Productive Classroom Culture** **Slides 57–62 Time Allotted: 40 minutes** ***Critical Idea*** • This slide introduces Session 6. ***Step-By-Step Instructions*** • Say, "We will now begin Session 6." ***Words of Wisdom*** • For Session 6, the facilitator may want to organize participants in new mixed-grade-level groups to encourage participants to continue to have conversations with people they haven't yet spoken with.	


Slide 58
Time Allotted:
7 minutes
	Critical Idea
	• The purpose of this activity is to surface each person's ability to overcome struggle successfully and to acknowledge that challenging and worthwhile learning is meaningful.
	• A growth mindset is necessary for optimal learning, but it is not sufficient. Students also need to acquire critical academic skills—their effort needs to be effective.
	
	Step-By-Step Instructions
	• Begin this section by connecting to Session 5 in Module 1 on growth mindsets.
	• Say,
	  ○ "Recall from Module 1, Session 5, the discussion about *growth mindsets*. In that session, we highlighted the importance of praising students' *effort* rather than simply their products. A key takeaway from Module 1 is that a growth mindset is necessary but not on its own sufficient. Students also need to acquire critical academic skills—their effort needs to be effective."
	• Ask participants to think of a situation when they struggled to learn something new in either a personal or a professional situation.
	• Tell participants to individually answer the questions on the slide, noting their responses on a sticky note. Allow 1 minute of independent think time.
	• Set the timer for 5 minutes. Ask participants to share at their tables their examples of struggle. Circulate as participants talk, and listen for commonalities in the behaviors described.
	• Say,
	  ○ "Research emerging over the past decade tells us that students' attitudes, beliefs, and behaviors can dramatically affect their learning and their success in school. As educators, we strive to build the capabilities and desires of students to **engage**, to **succeed**, and to **persist** in school. An important component of this work, and the focus of this session, is empowering you with research findings about how students learn and achieve, and with strategies to translate that research into daily practice."
	  ○ "In this session, you will learn about key ideas that, when effectively and consistently applied, have the power to dramatically reshape outcomes of teaching, learning, and instructional systems."
	  ○ "As you investigate these ideas, you will consider strategies that enable you to **apply** findings from research in the classroom and **enact** changes in the culture of your school systems."
	Words of Wisdom
	• Allow enough time for each person in the group to share.
		Sticky notes

Time & Slide Thumbnail	Facilitator Notes Session 6: Productive Classroom Culture in the EngageNY Curriculum	Materials
 Slide 59 Time Allotted: 8 minutes	***Critical Idea*** • Adults play a significant role in helping students develop persistence and apply **effective effort**—proven strategies paired with attitudes and beliefs that enable students to achieve. • The growth mindset is not just about effort. Getting smarter is about *effective effort* that leads to learning. ***Step-By-Step Instructions*** • Point participants to handout **M4_P-06_Persistence and effective effort.** Set a timer for 4 minutes. Ask participants to silently read the article and highlight a word, a sentence, and a phrase that they find particularly important for their work with students. • Once participants are done reading, **animate the slide**. • Ask participants to follow the instructions on the slide in their groups. Each member should take turns and share their sentence, phrase, and word before discussing any insights they gained from the reading. ***Words of Wisdom*** • If participants finish the reading text analysis before the 4 minutes has passed, encourage them to connect what they read to the previous discussion about their own experience with struggling to learn something.	Timer **M4_P-06** Persistence and effective effort

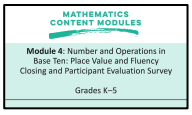

Slide 60
Time Allotted:
5 minutes
	Critical Idea
	• Incorporating strategies and opportunities that promote students' persistence and effective effort can improve the overall culture of learning in classrooms.
	
	Step-By-Step Instructions
	• Say,
	  ○ "Let's review some of the key ideas from the research we just read."
	• **Animate the slide** to reveal "Key ideas from research," and discuss each one.
	  ○ "With this research came some specific educator actions that can encourage persistence and effective effort."
	  ○ "Talk at your table groups about what practices you use in your classroom to encourage persistence and effective effort."
	• Allow a couple minutes for participants to discuss at their groups. Have a few participants share out.
	• Say,
	  ○ "Here are some specific educator actions taken from the research that can help encourage persistence and effective effort."
	• **Animate the slide** to reveal "Educator actions," then discuss each one.
	
	Words of Wisdom
	• It is important that participants record their own practices before you animate the educator actions on the slide.	

 Slide 61 Time Allotted: 15 minutes	***Critical Idea*** • Incorporating strategies and opportunities that promote students' persistence and effective effort can improve the overall culture of learning in classrooms. ***Step-By-Step Instructions*** • Say, ○ "Now we will connect the research to your EngageNY curriculum." • Direct participants to locate the lesson they planned with in the previous session.	

Time & Slide Thumbnail	Facilitator Notes Session 6: Productive Classroom Culture in the EngageNY Curriculum	Materials

	• Once they have located their lesson, **animate the slide**.
	• Say,
	  ○ "Revisit the EngageNY lesson and identify the places that support students in persistence and effective effort. As you look through the lesson, look for the following" (**animate the slide**):
	  – "Places where students are likely to struggle"
	  – "Places where you can model that making mistakes and taking risks are ways we learn"
	  – "Places where you can provide feedback to students that encourages metacognition and other effective effort strategies."
	  – "Places where you can apply the specific educator actions you discussed on the previous slide."
	• **Animate the slide**.
	• Say,
	  ○ "In addition, be prepared to share at least 2 ways to increase opportunities for students to persist in the lesson. More specifically, identify a place where you might model persistence through a think-aloud or similar strategy, and another way you might anticipate students' struggle and prepare appropriate responses."
	• Set the timer for 10 minutes. Circulate around the room while teachers are analyzing the lesson.
	• Once time is up, ask participants to share the 2 ways they will support persistence and effective effort in the EngageNY lesson.
	
	Words of Wisdom
	• The last activity of the slide is very powerful. Teachers are able to share strategies of how to use an EngageNY lesson to support growth mindsets and effective effort with students.	

 Slide 62 Time Allotted: 5 minutes	***Critical Idea*** • Reflecting on our learning is important to solidifying understanding and making progress toward accomplishing the goals of the initiative. ***Step-By-Step Instructions*** • Remind the group that it is essential that we take a deliberate pause in our work to reflect on this experience. • Display the reflection questions and ask participants to take a minute and individually reflect on these questions, noting their reflections on a piece of scrap paper or a sticky note. • After their individual reflection, ask participants to discuss their reflections at their table groups. • Call on participants to share something they heard a colleague say for each of the questions. ***Words of Wisdom*** • It is important to acknowledge where faculty might struggle in providing opportunities for students to persist.	

Module 4	Facilitator Notes Closing Slides and Participant Evaluation Survey	Materials
 Slide 63 Time Allotted: < 1 minute	**Module 4 Closing and Participant Evaluation Survey** **Slides 63–65 Time Allotted: 15 minutes** ***Critical Idea*** • Slides 63–65 serve as closing slides for Module 4. ***Step-By-Step Instructions*** • Not applicable ***Words of Wisdom*** • Not applicable	
  Slide 64 Time Allotted: < 1 minute	***Critical Idea*** • This slide provides references for Module 4. ***Step-By-Step Instructions*** • Say, "These are the references for Module 4." • Transition to the next slide. ***Words of Wisdom*** • This slide should be brief.	
  Slide 65 Time Alotted: 10 minutes	***Critical Idea*** • Participant feedback is highly valued and is critical to informing future learning sessions. ***Step-By-Step Instructions*** • Say, "In order to gather feedback of your learning experience, you will take a module evaluation survey. Your responses are very important, so we are providing the next 10 minutes to complete the survey." ***Words of Wisdom*** • Participants should complete the evaluation survey during the session.	http://www.utdanacenter.org/ldoe/surveys