Math Common Core Overview: Module 3-RIGOR

POWERPOINT SLIDE	TOPIC	FACILITATOR TIPS/ACTIVITY	MATERIALS	GROUPINGS
		• Welcome! This module was created as part of a series of training for Math CCSS. • Check the materials list well in advance of completing or using this module for training.	• Module PPT • Facilitator's Guide • Math CCSS • Copy of PowerPoint for note taking • Individual copies of Slide 18 - fluency problems • Individual copies of sample rigor problems on Slide • Speakers (for Video) • Markers/ pens/ pencils • Post Its • Chart Paper	
Slide 1-2	Overview	• Introduce today's Professional Development: "Today's session is an overview of the key shifts that the Common Core State Standards require for mathematics. We will be learning about the first of three shifts through this slide show as well as through some hands- on activities to help us understand the key components of this shift. Through this we hope to gain a better understanding of the Standards for Mathematics which in turn will better prepare our students." • Review essential questions with participants.		Whole Group
Slide 3	Video Clip	• We are going to start with a brief video from	• Post-Its	Small Group/

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		two of the authors of the CCSS explaining the process and implications of the CCSS. Be thinking about how this is different than what we are doing currently . . . why are the CCSS important change in mathematics education? • View the video and have participants write their responses/thoughts on post-its. • Shares responses/thoughts in small group and then whole group		Whole Group
Slide 4 - 7	Background and Rationale for CCSS	• Review each slide with the group comparing responses/thoughts and engaging any questions that may arise		Whole Group
Slide 8	Introduction of the 3 Shifts	• Here are the three shifts in mathematics. {Read the slide} • They are meant to be succinct, and easy to remember; we'll discuss them each in turn.		Whole Group
Slide 9 & 10	Description of Shift #3 - Rigor	• What does rigor mean? {Read slide} • This word can mean many different things. For purposes of describing the shifts of the standards, it does not mean "more difficult." For example, stating that "the standards are more rigorous" does not mean that "the standards are just harder." • Here rigor is about the depth of what is expected in the standards, and also about		Whole Group

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		what one should expect to see happening in the classroom, in curricular materials, etc.		
Slide 11	Video Clip	• Watch video clip with participants and prompt teachers to consider what statements stand out to them, how is this different from our current curriculum, etc.		Whole Group
Slide 12	Conceptual Understanding	• One aspect of rigor is building solid conceptual understanding. Once we have a set of standards that are fact focused, teachers and students have the time and space to develop solid conceptual understanding. • There is no longer the pressure to quickly teach students how to superficially get to the answer, often relying on tricks or mnemonics. The standards instead require a real commitment to understanding mathematics, not just how to get the answer. • As an example, it is not sufficient to simply know the procedure for finding equivalent fractions, but students also need to know what it means for numbers to be written in equivalent forms. • Attention to conceptual understanding is one way that we can start counting on students building on prior knowledge. It is very difficult to build further math proficiency on a set mnemonics or discrete procedures.		Whole Group

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Slide 13	Conceptual Understanding	• Here is an example of a place value chart that you get when you search for "place value worksheets" online. It is also a non-example of work that would elicit conceptual understanding. As you can see, it would not be possible to assess whether your students had a conceptual understanding of place value by them completing this worksheet. It would be fairly obvious to a student who does not understand place value that the first number goes with thousands, the 2nd number with hundreds, the 3rd number with tens and so on. • Here is a snapshot of a worksheet practicing place value understanding. You can see how a teacher would be able to assess a student's conceptual understanding of place value more clearly with the results of this worksheet. In these problems, the base ten units are bundled in different ways. We see that if the order is always given "correctly," then all we do is teach students rote strategies without thinking about the size of the units or how to encode them in positional notation.		Whole Group
Slide 14	3 Ideas of Computational Fluency	• Another aspect of rigor is procedural skill and computational fluency. {read slide} • Note that this is not memorization absent of understanding. This is the outcome of a		Whole Group

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		carefully laid out learning progression. At the same time, we can't expect fluency to be a natural outcome without addressing it specifically in the classroom and in our materials. Some students might require more practice than others, and that should be attended to. Additionally, there is not one approach to get to speed and accuracy that will work for all students. All students, however, will need to develop a way to get there.		
Slide 15	Required Fluencies in K-6	• This chart shows a breakdown of the required fluencies in grades K-6. • Fluent in the particular Standards cited here means "fast and accurate." It might also help to think of fluency as meaning the same thing as when we say that somebody is fluent in a foreign language: when you're fluent, you flow. Fluent isn't halting, stumbling, or reversing oneself. • The word fluency was used judiciously in the Standards to mark the endpoints of progressions of learning that begin with solid underpinnings and then pass upward through stages of growing maturity.		Whole Group
Slide 16	Application	• Read and discuss slide. • Using mathematics in problem solving contexts is the third leg of the stool supporting the learning that is going on in the		Whole Group

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		math classroom. This is the "why we learn math" piece. We learn it so we can apply it in situations that require mathematical knowledge. • There are requirements for application all the way throughout the grades in the CCSS. {read slide} But again, we can't just focus solely on application—we need also to give students opportunities to gain deep insight into the mathematical concepts they are using and also develop fluency with the procedures that will be applied in these situations. • The problem-solving aspect of application is what's at stake here—if we attempt this with a lack of conceptual knowledge and procedural fluency, the problem just becomes three times harder. • At the same time, we don't want to save all the application for the end of the learning progression. Application can be motivational and interesting, and there is a need for students at all levels to connect the mathematics they are learning to the world around them.		
Slide 17 & 18	Fluency Problems	• Read the standard/commentary with group. • Distribute task to participants. • Have them solve problems in small groups. • Discuss how these problems demonstrate fluency with whole group.	Individual copies of Slide 18 – Fluency Problems	Small Group/Whole Group

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Slide 19	Group Discussion of Rigor	• Read slide and discuss in small groups.		Small Group
Slide 20	Rigor Sample Problems	• Read slide with group. • Distribute sample problems to participants. • Have them solve 2 & 3 problems. • Discuss questions on slide.	Copies of Sample Rigor Problems	Small Group/Whole Group
Slide 21	Making a True Statement	• Have participants fill in the missing words to make statement true.		Whole Group
Slide 22	Summarizing the Shift	• Work with group to make a chart reflecting on the third shift Rigor: • What is Rigor? • Why Rigor? • What are opportunities for change? • What are challenges we may encounter? • Share chart whole group	Chart Paper	Small Group/ Whole Group