Module 4
Participant Guide

Focus on Designing Learning

Connecticut Core Standards for Mathematics

Grades K–5

Systems of Professional Learning

Connecticut Core Standards Systems of Professional Learning

The material in this guide was developed by Public Consulting Group in collaboration with staff from the Connecticut State Department of Education and the RESC Alliance. The development team would like to specifically thank Ellen Cohn, Charlene Tate Nichols, and Jennifer Webb from the Connecticut State Department of Education; Leslie Abbatiello from ACES; and Robb Geier, Elizabeth O'Toole, and Cheryl Liebling from Public Consulting Group.

The Systems of Professional Learning project includes a series of professional learning experiences for Connecticut Core Standards District Coaches in English Language Arts, Mathematics, Humanities, Science, Technology, Engineering, Mathematics (STEM), and Student/Educator Support Staff (SESS).

Participants will have continued support for the implementation of the new standards through virtual networking opportunities and online resources to support the training of educators throughout the state of Connecticut.

Instrumental in the design and development of the Systems of Professional Learning materials from PCG were: Sharon DeCarlo, Debra Berlin, Jennifer McGregor, Judy Buck, Michelle Wade, Nora Kelley, Diane Stump, and Melissa Pierce.

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- Supporting Teachers

Post-Assessment, Session Evaluation, and Wrap Up

Introductory Activity

Introductory Activity

Pre-Assessment–CCS-Math

Instructions: Check the box on the scale that best represents your knowledge or feelings about implementing the Connecticut Core Standards for Mathematics (CCS-Math) in your classroom.

Self-Assessment Questions	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
I understand the organization of the CCS-Math.				
I understand the implications of the structure of the CCS-Math.				
I have a good sense of the progression of the mathematics within the CCS-Math.				
I can create effective learning targets for CCS-Math lessons.				
I am aware of strategies for assessing students' prior knowledge.				
I am able to design a CCS-Math lesson.				
I am able to assess a CCS-Math lesson using the EQuIP Rubric and the UDL principles.				
I have a plan for determining where my teachers are in terms of prior knowledge and understanding of the structure of the CCS-Math, and their readiness to design CCS-Math aligned learning.				

Section 1

Section 1: Sharing Implementation Experiences

Moving Forward with the CCS-Math

***Instructions**: Discuss with your table group one positive highlight, one question that you have as coaches, and one ongoing need for teachers from your personal implementation of the CCS-Math thus far. Each table group will then determine two positive highlights, two questions, and two ongoing needs that they will present to the larger group. Use the space on the next page to record "new ideas" generated during the sharing of experiences implementing CCS-Math.*

Positive Highlights
Questions
Ongoing Needs

New Ideas for Implementing the CCS-Math

***Instructions**: Use the space below to record "new ideas" generated during the sharing of experiences implementing CCS-Math.*

New Ideas	

Section 2

Section 2: Creating Learning Targets

The Structure of the Standards

***Instructions**: When directed, read the following essay written by Phil Daro, Bill McCallum, and Jason Zimba. Use this information to inform your group discussions.*

The Structure is the Standards

Essay by Phil Daro, William McCallum, and Jason Zimba, February 16, 2012

http://commoncoretools.me/2012/02/16/the-structure-is-the-standards/


A Grecian urn

You have just purchased an expensive Grecian urn and asked the dealer to ship it to your house. He picks up a hammer, shatters it into pieces, and explains that he will send one piece a day in an envelope for the next year. You object; he says "don't worry, I'll make sure that you get every single piece, and the markings are clear, so you'll be able to glue them all back together. I've got it covered." Absurd, no? But this is the way many school systems require teachers to deliver mathematics to their students; one piece (i.e. one standard) at a time. They promise their customers (the taxpayers) that by the end of the year they will have "covered" the standards.

In the Common Core State Standards, individual statements of what students are expected to understand and be able to do are embedded within domain headings and cluster headings designed to convey the structure of the subject. "The Standards" refers to all elements of the design—the wording of domain headings, cluster headings, and individual statements; the text of the grade level introductions and high school category descriptions; the placement of the standards for mathematical practice at each grade level.

The pieces are designed to fit together, and the standards document fits them together, presenting a coherent whole where the connections within grades and the flows of ideas across grades are as visible as the story depicted on the urn.

The analogy with the urn only goes so far; the Standards are a policy document, after all, not a work of art. In common with the urn, however, the Standards were crafted to reward study on multiple levels: from close inspection of details, to a coherent grasp of the whole. Specific phrases in specific standards are worth study and can carry important meaning; yet this meaning is also importantly shaped by the cluster heading in which the standard is found. At higher levels, domain headings give structure to the subject matter of the discipline, and the practices' yearly refrain communicates the varieties of expertise which study of the discipline develops in an educated person.

Fragmenting the Standards into individual standards, or individual bits of standards, erases all these relationships and produces a sum of parts that is decidedly less than the whole. Arranging the Standards into new categories also breaks their structure. It constitutes a remixing of the Standards. There is meaning in the cluster headings and domain names that is not contained in the numbered statements beneath them.

Remove or reword those headings and you have changed the meaning of the Standards; you now have different Standards; you have not adopted the Common Core.

Sometimes a remix is as good as or better than the original. Maybe there are 50 remixes, adapted to the preferences of each individual state (although we doubt there are 50 good ones). Be that as it may, a remix of a work is not the same as the original work, and with 50 remixes we would not have common standards; we would have the same situation we had before the Common Core.

Why is paying attention to the structure important? Here is why: The single most important flaw in United States mathematics instruction is that the curriculum is "a mile wide and an inch deep." This finding comes from research comparing the U.S. curriculum to high performing countries, surveys of college faculty and teachers, the National Math Panel, the Early Childhood Learning Report, and all the testimony the CCSS writers heard. The standards are meant to be a blueprint for math instruction that is more focused and coherent. The focus and coherence in this blueprint is largely in the way the standards progress from each other, coordinate with each other and most importantly cluster together into coherent bodies of knowledge. Crosswalks and alignments and pacing plans and such cannot be allowed to throw away the focus and coherence and regress to the mile-wide curriculum.

Another consequence of fragmenting the Standards is that it obscures the progressions in the standards. The standards were not so much assembled out of topics as woven out of progressions. Maintaining these progressions in the implementation of the standards will be important for helping all students learn mathematics at a higher level. Standards are a bit like the growth chart in a doctor's office: they provide a reference point, but no child follows the chart exactly. By the same token, standards provide a chart against which to measure growth in children's knowledge. Just as the growth chart moves ever upward, so standards are written as though students learned 100% of prior standards. In fact, all classrooms exhibit a wide variety of prior learning each day. For example, the properties of operations, learned first for simple whole numbers, then in later grades extended to fractions, play a central role in understanding operations with negative numbers, expressions with letters and later still the study of polynomials. As the application of the properties is extended over the grades, an understanding of how the properties of operations work together should deepen and develop into one of the most fundamental insights into algebra. The natural distribution of prior knowledge in classrooms should not prompt abandoning instruction in grade level content, but should prompt explicit attention to connecting grade level content to content from prior learning. To do this, instruction should reflect the progressions on which the CCSSM are built. For example, the development of fluency with division using the standard algorithm in grade 6 is the occasion to surface and deal with unfinished learning with respect to place value. Much unfinished learning from earlier grades can be managed best inside grade level work when the progressions are used to understand student thinking.

This is a basic condition of teaching and should not be ignored in the name of standards. Nearly every student has more to learn about the mathematics referenced by standards from earlier grades. Indeed, it is the nature of mathematics that much new learning is about extending knowledge from prior learning to new situations. For this reason, teachers need to understand the progressions in the standards so they can see where individual students and groups of students are coming from, and where they are heading. But progressions disappear when standards are torn out of context and taught as isolated events.

Notes on the Progressions Documents

***Instructions**: Use the questions below to make notes on the Progressions documents (http://ime.math.arizona.edu/progressions/) and to guide your small group discussion.*

1. What information do the Progressions documents provide?

2. Why is this information important?

3. How can this information be useful to teachers?

Learning Target Planning Template

***Instructions**: Use the template provided as you work through using the mathematics within the Standards and the information provided in the Progressions documents to create your learning targets.*

Part 1: Critical Areas and Key Ideas
Grade Level:
Critical Area:
Key Ideas:

Learning Target Planning Template

Part 2: Connections to Clusters and Individual Standards
Focus Idea:
Cluster Heading 1:
Supporting Standards for Cluster Heading 1:
Cluster Heading 2:
Supporting Standards for Cluster Heading 2:

Learning Target Planning Template

Part 3: Creating Learning Targets
If I want students to:
Students will:
Students will:
Students will:
Students will:
If I want students to:
Students will:
Students will:
Students will:
Students will:

Section 3

Section 3: Identifying an Entry Point into the Mathematics

Determining Prior Knowledge

Instructions: *Use the space provided to record the prior knowledge identified within the domain progressions and to create the questions to be answered as part of an assessment of students' prior knowledge.*

Prior Knowledge Identified in the Domain Progressions

Questions to be Answered through an Assessment of Students' Prior Knowledge

Assessing Prior Knowledge

Instructions: *Use the space provided to plan how students' prior knowledge will be assessed.*

Assessment of Prior Knowledge

Addressing Gaps in Prior Knowledge

Instructions: *Use the space below to brainstorm ideas to address content gaps in prior knowledge that you will work into your lesson plan in Section 4.*

Ideas for Addressing Content Gaps

Section 4

Section 4: Designing CCS-Math Lessons

Ingredients of an Effective CCS-Math Lesson

Instructions: *Use the space provided to record the ingredients of an effective CCS-Math lesson.*

Ingredients of an Effective CCS-Math Lesson

Sample CCS-Math Lesson Design Template

Instructions: Use the template provided as you plan your CCS-Math lesson. (Note: This template is also available on http://ctcorestandards.org.)

Grade Level, Subject, and Unit Title:	
Lesson # and Title:	**Author of Lesson:**
CT Core Standards / Standards for Mathematical Practice	
• What is the critical area that this lesson addresses? • What standards, both Content and Practice Standards, are aligned to this critical area? • What standards, both Content and Practice Standards, can I address in this lesson?	
Learning Target(s)	
• What do I want students to know, understand, and be able to do at the end of this lesson? • How do these learning targets help to address the key ideas of the critical area being developed? • How will I know if students have met these learning targets?	
Connections to other Mathematical Concepts / Other Subjects	
• How are the standards chosen for this lesson connected to previous or future learning? • How do the learning goals relate to the big ideas of the critical area being addressed? • How do the concepts and learning goals chosen fit into the mathematical progression of understanding being developed? • What connections to previous lessons can be made through this lesson? • What connections to the next lesson in the overall unit of instruction can be made at the end of this lesson?	
Resources, Learning Materials, and Technology	
• What resources, learning materials, and technology do I have available to help students meet the learning goals? • What resources, learning materials, and technology will I use in this lesson? • Why are these the best choices of resources, learning materials, and technology for the learning goals of this lesson? • How will the chosen resources, learning materials, and technology help students meet the learning goals?	
New Vocabulary	
• What new vocabulary will students come to understand as the result of this lesson? • Do students need to have an understanding of the vocabulary word itself in order to move forward in the lesson or can the term be connected to the concept at the end of the lesson? • What vocabulary might students uncover during the creation of their own solution strategy?	

<table>
<tr><td colspan="2">Lesson Notes (e.g., grouping)</td></tr>
<tr><td colspan="2">• How will students work in this lesson (groups, pairs, individually)?
• Why are students working in groups, pairs, individually?
• What questions do I want to make sure students can answer during the course of this lesson?
• With what or how will students produce their work (in a notebook, on the board, on chart paper, etc.)?</td></tr>
<tr><td colspan="2">Pre-assessment and Formative Assessment Strategies</td></tr>
<tr><td colspan="2">• How will I determine if my students have gaps in their prior knowledge?
• What prior knowledge do I need to assess in order to determine the entry point into the learning targets?
• What will I do during the lesson to determine if students are making progress towards the learning goals?
• What will I do if I identify a misconception during the lesson?</td></tr>
<tr><td>Opening (Daily Review / Engaging students)</td><td>Meeting Students' Needs</td></tr>
<tr><td>• How will the lesson be introduced?
• What connections will be made to prior lessons?
• What questions will I ask during the opening to activate students' thinking?
• What misconceptions and assumptions might need to be addressed at this point?
• What challenges do I need to account for here that may impact the outcome of the lesson?</td><td>Interventions
• How will I ensure that all students understand the task/problem/activity?
• How can I do this without lowering the cognitive demand of the lesson?

Extensions
• How can I extend students' thinking around this concept (providing real world context, allowing for the developing of student created strategies, etc.)?</td></tr>
<tr><td>Lesson Sequence: Instructional strategies, Tasks, Group work, Guided and Independent practice, etc.</td><td>Meeting Students' Needs</td></tr>
<tr><td>• What tasks/problems/activities will students work on during this lesson?
• Are there specific expectations that I want students to meet (use of multiple representations, written complete solutions, explanations of thought process, etc.)?
• Will students be given individual think time prior to work with peers?</td><td>Interventions
• How will I ensure that all students understand the task/problem/activity?
• How can I do this without lowering the cognitive demand of the lesson?</td></tr>
</table>

<table>
<tr><td>Is there a process for group work that should be followed?
At what points will formative assessment take place?
How will I provide students feedback on their work throughout the lesson?
When observing and listening to students work, what do I want to see and what do I want to hear?
What might I see and/or hear that would signal a misconception being applied or developed?</td><td>Extensions
How can I extend students' thinking around this concept (providing real world context, allowing for the developing of student created strategies, etc.)?</td></tr>
<tr><td>Closing and Assessment</td><td>Meeting Students' Needs</td></tr>
<tr><td>How will I have students present their work?
How will I determine what work is shared with the class?
How will I wrap up the lesson (communication of a summary statement, an extension activity, etc.)?
How will I help students to anticipate what will happen in the next lesson?
How can I provide additional practice on this concept?</td><td>Interventions
How will I ensure that all students have developed the deeper mathematical understanding from the task/problem/activity?
How can I do this without lowering the cognitive demand of the lesson?
Extensions
How can I extend students' thinking around this concept (providing real world context, allowing for the developing of student created strategies, etc.)?</td></tr>
<tr><td>Homework</td><td>Meeting Students' Needs</td></tr>
<tr><td>What are the next steps for students?</td><td>How can I provide appropriate next steps for all students?</td></tr>
<tr><td colspan="2">Reflection</td></tr>
<tr><td colspan="2">Which part(s) of the lesson am I most comfortable with?
Which part(s) of the lesson am I least comfortable with?
How will I judge the success of the lesson?</td></tr>
</table>

All templates and handouts for lesson should be attached as a part of the lesson plan.

RESOURCES FOR PLANNING LESSONS

- Illustrative Mathematics – http://www.illustrativemathematics.org
- Achieve the Core – http://achievethecore.org
- Smarter Balanced – http://smarterbalanced.org
- Mathematics Assessment Project – http://map.mathshell.org/materials/index.php

REFLECT

Instructions: Answer the following reflection questions:

1. How will the regular use of a template like this affect classroom instruction in your setting?

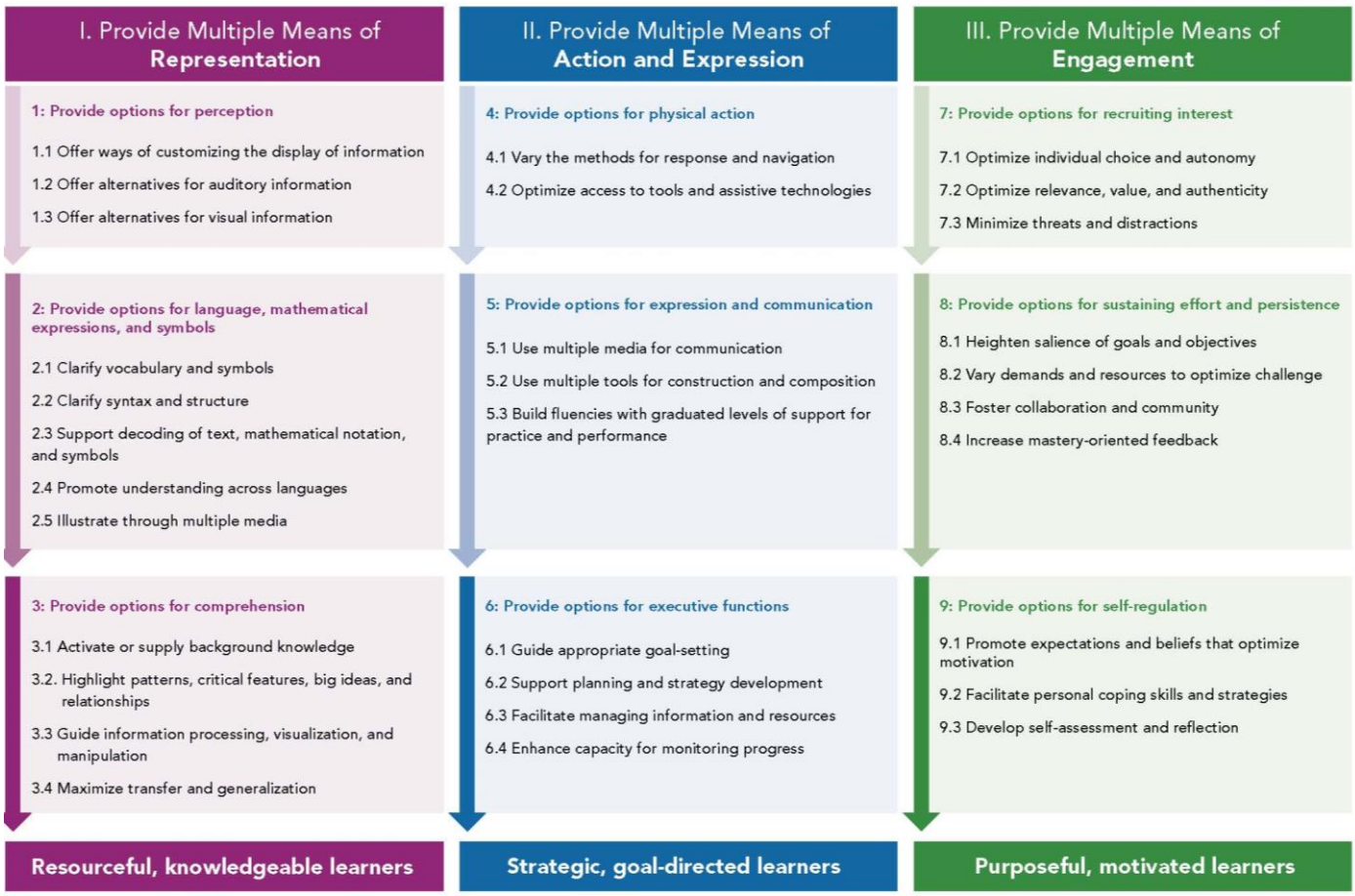
2. Is there anything you would change about the template?

Section 5

Section 5: Reflecting on the Lesson Design

Universal Design for Learning Principles

***Instructions**: Use the chart below as a reference for the Principles, Guidelines, and Checkpoints of Universal Design for Learning.*



CAST

Lesson Design Evaluation

***Instructions**: Evaluate your lesson design using the EQuIP rubric and the UDL Principles. Use the space below to record any strengths/weaknesses that you find in your lesson design based on this evaluation. Make modifications as necessary to the lesson.*

Evaluation of lesson design based on the EQuIP Rubric

Evaluation of lesson design based on the UDL Principles

Section 6

Section 6: Supporting Teachers

Determining an Entry Point into the Work

Instructions: *Use the space below to record 3–5 questions that you want to answer about teachers' readiness, prior knowledge, and understanding of the structure of the Standards and how to design learning that is aligned to the CCS-Math. As you answer the questions when you are back at your school, record your findings in the space below. Be sure to bring your answers with you to the Module 5 session.*

Questions	How to Get Answers	Answers

Questions	How to Get Answers	Answers

Notes:

Closing Activities

Closing Activities

Post-Assessment–CCS-Math

Instructions: Check the box on the scale that best represents your knowledge or feelings about implementing the CCS-Math in your classroom.

Self-Assessment Questions	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
I understand the organization of the CCS-Math.				
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I have a plan for determining where my teachers are in terms of prior knowledge and understanding of the structure of the CCS-Math, and their readiness to design CCS-Math aligned learning.				

Session Evaluation

Thank you for attending today's session. Your feedback is very important to us! Please fill out a short survey about today's session. The survey is located here: http://surveys.pcgus.com/s3/CT-Math-Module-4-K-5.

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