Module 2
Participant Guide

Focus on Content Standards

Connecticut Core Standards for Mathematics

Grades 6–12

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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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 am confident in my ability to assist teachers in their implementation of the CCS-Math Practice Standards.				
I understand and can communicate the implications of the language of the CCS-Math Content Standards.				
I can describe the progression of mathematical concepts and provide teachers with resources for identifying progressions at their grade level.				
I can promote and support teaching with cognitively rigorous tasks to meet the expectations of the CCS-Math Content Standards.				
I am aware of and can share multiple instructional strategies to teach the Content Standards through problem solving.				
I have a plan to support the implementation of the CCS-Math in my school and have identified solutions to potential challenges.				

Section 1

Section 1: Sharing Implementation Experiences

Moving Forward with the Practices

***Instructions**: Discuss with your table group one positive highlight, one challenge, and one lesson learned from your personal implementation of the Practice Standards thus far. Each table group will then determine two positive highlights, one common challenge, and one common lesson learned 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 Practice Standards.*

Positive Highlights
Ongoing Challenges
Lessons Learned

New Ideas for Implementing the CCS-Math Practice Standards

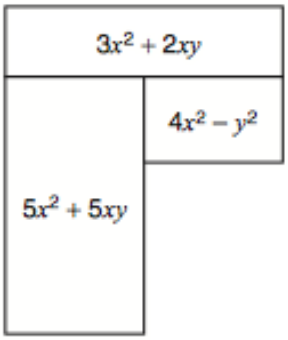
Section 2

Section 2: The Language of the Content Standards

Who Knows Math

Instructions: *Read the five student responses to the problem given below. Record your observations of what each student knows and what they can do.*

21 The expression inside each of these rectangles represents the area, in square units, of the rectangle.



a. Write an algebraic expression in simplified form to represent the sum of the areas of all the rectangles.

b. What is the total area, in square units, of the rectangles when $x = 5$ and $y = 2$?

Retrieved from https://www.ride.ri.gov/Portals/0/Uploads/Documents/Instruction-and-Assessment-World-Class-Standards/Assessment/NECAP/Released-Items/NECAP-2011-Gr11-Math-Student-Work-Samples.pdf

Student 1:

21

A- $12x^2 + 7xy - y^2$

B- $12(5)^2 + 7(5)(2) - 2^2$

$3600 + 17 - 4$

$3600 + 13$

Area = 3613^2

Observations:

Student 2:

21

a.) $12x^2 + 8x - 4^2$

b.) 186

Observations:

Student 3:

21

(a) $12x^2 + 7xy - y^2$

(b) 366

$(5x^2 + 5xy) + (3x^2 + 2xy) + (4x^2 - y^2)$

$12x^2 + 7xy - y^2$

$12(5)^2 + 7(5)(2) - (2)^2 = 366$

$12(25) + 7^{(10)} - 4$

$300 + 70 - 4$

$370 - 4$

Observations:

Student 4:

21

A.) $3x^2 + 2xy$
$5x^2 + 5xy$
$4x^2 - y^2$

$12x^6 + 7xy - y^2$

B.) $5 * 12 = 60^6 + 7xy - y^2$

Observations:

Student 5:

21

a) $(3x^2 + 2xy) + (5x^2 + 5xy) + (4x^2 + y^2) =$ $12x^2 + 7xy + y^2$ sum of areas

b) $12(5)^2 + 7(5)(2) + (2)^2 = 12(25) + 7(10) + 4 = 300 + 70 + 4 = 374$

12
25
GO
240
300

The total area is 374 square units

Observations:

Notes on Conceptual Understanding, Procedural Skill and Fluency, and Application of Mathematics

***Instructions**: Watch the video* Mathematics Fluency: A Balanced Approach *retrieved from:* http://www.youtube.com/watch?v=ZFUAV00bTwA. *After the video has played, use the space below to record notes on conceptual understanding, procedural skill and fluency, and application of mathematics that you will communicate with your peers back at your school.*

Conceptual Understanding
"Students demonstrate *conceptual understanding* in mathematics when they provide evidence that they can recognize, label, and generate examples of concepts; use and interrelate models, diagrams, manipulatives, and varied representations of concepts; identify and apply principles; know and apply facts and definitions; compare, contrast, and integrate related concepts and principles; recognize, interpret, and apply the signs, symbols, and terms used to represent concepts. *Conceptual understanding* reflects a student's ability to reason in settings involving the careful application of concept of definitions, relations, or representations of either" (Balka, Hull, & Harbin Miles, n.d.).
Notes

Procedural Skill and Fluency
Notes:
Application of Mathematics
Notes:

Section 3

Section 3: The Progression of the Content Standards

Exploring the Content Standards Observation Sheet

Part 1 Instructions: *As a table group, explore Content Standards for one domain and determine which focus on Conceptual Understanding (CU), Procedural Skill and Fluency (PSF), and Application (A) of Mathematics. Use sticky notes to mark the cards with either CU, PSF, or A. After sorting the cards, answer the following questions.*

1. What are the expectations around conceptual understanding at your grade level?

2. What are the procedural skill and fluency expectations at your grade level?

3. What are the opportunities for application at your grade level?

Part 2 Instructions: *As a table group, explore Content Standards for one domain across grade levels, record five general observations and two connections to the Practice Standards.*

General Observations
1)
2)
3)
4)
5)
Observations on the Integration of Content and Practices
1)
2)

Part 3 Instructions: *In your grade-alike group, explore all of the Content Standards for one grade level and identify at least three content connections across multiple domains that can be referenced in a lesson or unit to support the deepening of students' mathematical understanding.*

Connection 1

Main Focus Standard(s)	Supporting and/or Connected Standards

Connection 2

Main Focus Standard(s)	Supporting and/or Connected Standards

Connection 3

Main Focus Standard(s)	Supporting and/or Connected Standards

Section 3 Reflection

Instructions: *After completing the Section 3 activities, view the video* Gathering Momentum for Algebra *from The Hunt Institute. After the video has played, use the space below to answer the following reflection questions.*

(The video can be found here: https://www.youtube.com/watch?v=ONPADo_Nt14.)

1. How might you help teachers at your school to fully understand the progressions of the Content Standards?

2. What questions do you anticipate teachers having about the Content Standards?

Section 4

Section 4: Meeting the Expectations of the Content Standards by Teaching with Cognitively Rigorous Tasks

Video Observation Sheet

Instructions: *View the video* Math Class Needs a Makeover *from TED.com. Use the space below to make notes on the video.*

(The video can be found here: http://www.ted.com/talks/dan_meyer_math_curriculum_makeover.html.)

Video Notes and Observations

Revised Bloom's Taxonomy	Webb's DOK Level 1 Recall & Reproduction	Webb's DOK Level 2 Skills & Concepts	Webb's DOK Level 3 Strategic Thinking/Reasoning	Webb's DOK Level 4 Extended Thinking
Remember Retrieve knowledge from long-term memory, recognize, recall, locate, identify	○ Recall, observe, & recognize facts, principles, properties ○ Recall/ identify conversions among representations or numbers (e.g., customary and metric measures)			
Understand Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion (such as from examples given), predict, compare/contrast, match like ideas, explain, construct models	○ Evaluate an expression ○ Locate points on a grid or number on number line ○ Solve a one-step problem ○ Represent math relationships in words, pictures, or symbols ○ Read, write, compare decimals in scientific notation	○ Specify and explain relationships (e.g., non-examples/examples; cause-effect) ○ Make and record observations ○ Explain steps followed ○ Summarize results or concepts ○ Make basic inferences or logical predictions from data/observations ○ Use models/diagrams to represent or explain mathematical concepts ○ Make and explain estimates	○ Use concepts to solve non-routine problems ○ Explain, generalize, or connect ideas using supporting evidence ○ Make and justify conjectures ○ Explain thinking when more than one response is possible ○ Explain phenomena in terms of concepts	○ Relate mathematical or scientific concepts to other content areas, other domains, or other concepts ○ Develop generalizations of the results obtained and the strategies used (from investigation or readings) and apply them to new problem situations
Apply Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task	○ Follow simple procedures (recipe-type directions) ○ Calculate, measure, apply a rule (e.g., rounding) ○ Apply algorithm or formula (e.g., area, perimeter) ○ Solve linear equations ○ Make conversions among representations or numbers, or within and between customary and metric measures	○ Select a procedure according to criteria and perform it ○ Solve routine problem applying multiple concepts or decision points ○ Retrieve information from a table, graph, or figure and use it solve a problem requiring multiple steps ○ Translate between tables, graphs, words, and symbolic notations (e.g., graph data from a table) ○ Construct models given criteria	○ Design investigation for a specific purpose or research question ○ Conduct a designed investigation ○ Use concepts to solve non-routine problems ○ Use & show reasoning, planning, and evidence ○ Translate between problem & symbolic notation when not a direct translation	○ Select or devise approach among many alternatives to solve a problem ○ Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
Analyze Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct	○ Retrieve information from a table or graph to answer a question ○ Identify whether specific information is contained in graphic representations (e.g., table, graph, T-chart, diagram) ○ Identify a pattern/trend	○ Categorize, classify materials, data, figures based on characteristics ○ Organize or order data ○ Compare/ contrast figures or data ○ Select appropriate graph and organize & display data ○ Interpret data from a simple graph ○ Extend a pattern	○ Compare information within or across data sets or texts ○ Analyze and draw conclusions from data, citing evidence ○ Generalize a pattern ○ Interpret data from complex graph ○ Analyze similarities/differences between procedures or solutions	○ Analyze multiple sources of evidence ○ Analyze complex/abstract themes ○ Gather, analyze, and evaluate information
Evaluate Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique			○ Cite evidence and develop a logical argument for concepts or solutions ○ Describe, compare, and contrast solution methods ○ Verify reasonableness of results	○ Gather, analyze, & evaluate information to draw conclusions ○ Apply understanding in a novel way, provide argument or justification for the application
Create Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce	○ Brainstorm ideas, concepts, or perspectives related to a topic	○ Generate conjectures or hypotheses based on observations or prior knowledge and experience	○ Synthesize information within one data set, source, or text ○ Formulate an original problem given a situation ○ Develop a scientific/mathematical model for a complex situation	○ Synthesize information across multiple sources or texts ○ Design a mathematical model to inform and solve a practical or abstract situation

Strategies for Differentiating Cognitively Rigorous Tasks

Instructions: *Use the space provided to make notes on each of the strategies presented.*

Scaffolding	**Open Questions**
Parallel Tasks	**C-R-A**

RESOURCES FOR FINDING TASKS

- 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. What other sites/materials do you know of that are good resources for cognitively rigorous tasks?

2. How do cognitively rigorous tasks relate to conceptual understanding, procedural skill and fluency, and application of mathematics?

3. How do cognitively rigorous tasks help students to develop the mathematical expertise in the Standards for Mathematical Practice?

Section 5

Section 5: Supporting Change

Video Observation Sheets

***Instructions**: As you watch the videos look for the instructional shifts required by the CCS-Math Content Standards (focus, coherence, and the three aspects of rigor) and reviewed during Module 2 as well as students exhibiting the Standards for Mathematical Practice (focus of Module 1).*

(The first video can be found here: https://www.teachingchannel.org/videos/adding-integers-lesson-idea.)

GRADE 7 VIDEO: WHAT'S YOUR SIGN: INTEGER ADDITION

Did you see evidence of the following and if so, what was the teacher doing and what were the students doing?

Element	Evidence
Development of Conceptual Understanding	
Development of Procedural Skill and Fluency	
Students Working through Tasks that Require the Application of Mathematics	
Use of Cognitively Rigorous Tasks	
Development of the Practice Standards	
Additional Instructional Strategies Used by the Teacher:	

GRADE 7 VIDEO: ZERO PAIRS, MANIPULATIVES, AND A REAL-WORLD SCENARIO

(The second video can be found here: https://www.teachingchannel.org/videos/teaching-subtracting-integers.)

Did you see evidence of the following and if so, what was the teacher doing and what were the students doing?

Element	Evidence
Development of Conceptual Understanding	
Development of Procedural Skill and Fluency	
Students Working through Tasks that Require the Application of Mathematics	
Use of Cognitively Rigorous Tasks	
Development of the Practice Standards	
Additional Instructional Strategies Used by the Teacher:	

A New Spin on Old Strategies

Instructions: *Use the space below to make notes on important points/ideas that you want to bring back to teachers at your school.*

Table 1: Math Journals

Table 2: Mathematical Language

Table 3: Engagement Strategies

Table 4: Group Work & Decision Making

Group 1: Math Journals

Math journals have been a staple in many mathematics classrooms over the years. Journals have been used to record notes, to complete homework, to answer writing prompts, and so forth. Today, however, math journals are taking on a slightly different role in the Common Core classroom. As students work to deepen their understanding of the mathematics content, teachers are working to help students develop the Math Practices. A student's math journal, or problem solving notebook as they are known by many, are playing a key role in Content and Practice Standards development.

MATH JOURNAL FAQS

- **How can math journals be used to promote mathematical understanding and help meet the goals of the Common Core Standards?** Part of students developing deep understandings in mathematics is being able to articulate their mathematical thinking and understanding. Math journals can be used to provide students with the opportunity to practice organizing their thoughts, to test out solution strategies, to use mathematics vocabulary, to clarify and reflect on their learning, to solve rich math problems, and so forth. When students are presented with a rich problem they can record their solution, along with the strategy and thought processes used to arrive at the solution. Math journals can also be a place for students to write about their learning. They can answer questions about what they already know about a topic before a lesson or unit is started and/or what they know about the topic at the end of the lesson or unit. A combination of prompts and problems can be used to develop a clearer picture of what students understand and are able to do.

- **What can I expect from my students as I introduce math journals?** Initially students will need extra support and guidance when learning how to record their thinking. You can expect students, especially young students, to use drawings and pictures to help support their thinking. It is important to note here that the use of pictures and/or multiple representations can continue to support students thinking, and help them to make connections, even after students are able to better articulate their thinking in words, so their use should be strongly encouraged. Provide several models for students to examine, complete journal entries together in large and small groups, and make sure to stress the importance of developing complete solutions (solutions that include words, pictures, charts, or graphs, and an explanation of thinking) versus one 'right' way to solve the problem even though students may, at first, be looking for the 'right' way. Encourage students to develop solutions that make sense to them even if the person next to them is doing something different. This may be difficult for students at first, but over time students will become more comfortable with the idea of creating multiple solutions over time.

- **What makes a good journal prompt or problem?** Good journal prompts and problems are no different from other problems and/or prompts that students are asked to complete. These problems and/or prompts:

- Allow for multiple entry points into the mathematics and recording techniques. These multiple entry points build differentiation into the discussion and tasks.
- Provide the opportunity for students to learn by answering the questions and for the teacher to learn about the student by examining their responses.
- Have more than one solution or a variety of possible solution paths that range from simple to complex and require more than just remembering a fact or reproducing a skill.
- Provide opportunities for students to represent their mathematical ideas using models and written language.
- Provide opportunities for students to justify their reasoning and evaluate the reasoning of others.
- Have clear, concise directions.
- Provide opportunities for group work and discussions.

- **How do I get started?** First, decide what type of notebook you want students to use for their journal. It is suggested that students use a notebook that pages cannot easily be removed from and are durable so that pages stay in place throughout the year. Then, determine what information you want all students to have on the first few pages of their journal. It is a good idea to have either a rubric or general expectations for journal entries that students can use as guidelines when completing their work. For example:

  - Try new ideas.
  - Use pictures, words, and math symbols.
  - Tell what you did and why (or, explain your thinking).
  - Don't erase. (This is important because you want to see how students thinking has changed over the course of solving a problem. You may ask older students to write in pen.)
  - Put the date on every entry.
  - Write down your questions.
  - Check your work.
  - Don't give up!

- Determine how often you will send the journals home. Sending journals home once a month or so is a good way for parents to see a record of their students' work and growth over time.

ADDITIONAL TIPS:

- Revisit problems that were particularly challenging for students and challenge them to think of another way to solve the problem now that they know more.

- Have students go back to questions they wrote in their journal about things they were unsure of and see if they can answer them on their own at a later date.

- Have students reflect on earlier entries and tell how their thinking about a topic or concept has changed.
- Use students' journals to show mastery/non-mastery of concepts.
- Provide students' notebooks to the teacher at the next grade level whenever possible so that students' have the resource for the next school year.

RESOURCE: MATH TEACHING RESOURCES

- http://www.k-5mathteachingresources.com/math-journals.html

Group 2: Mathematical Language

CONCEPT CARD: MODIFIED FRAYER MODEL

Description

The Frayer Model was developed by Dorothy Frayer and her colleagues at the University of Wisconsin. This model is used to help students graphically represent new concepts and/or terms.

New Spin

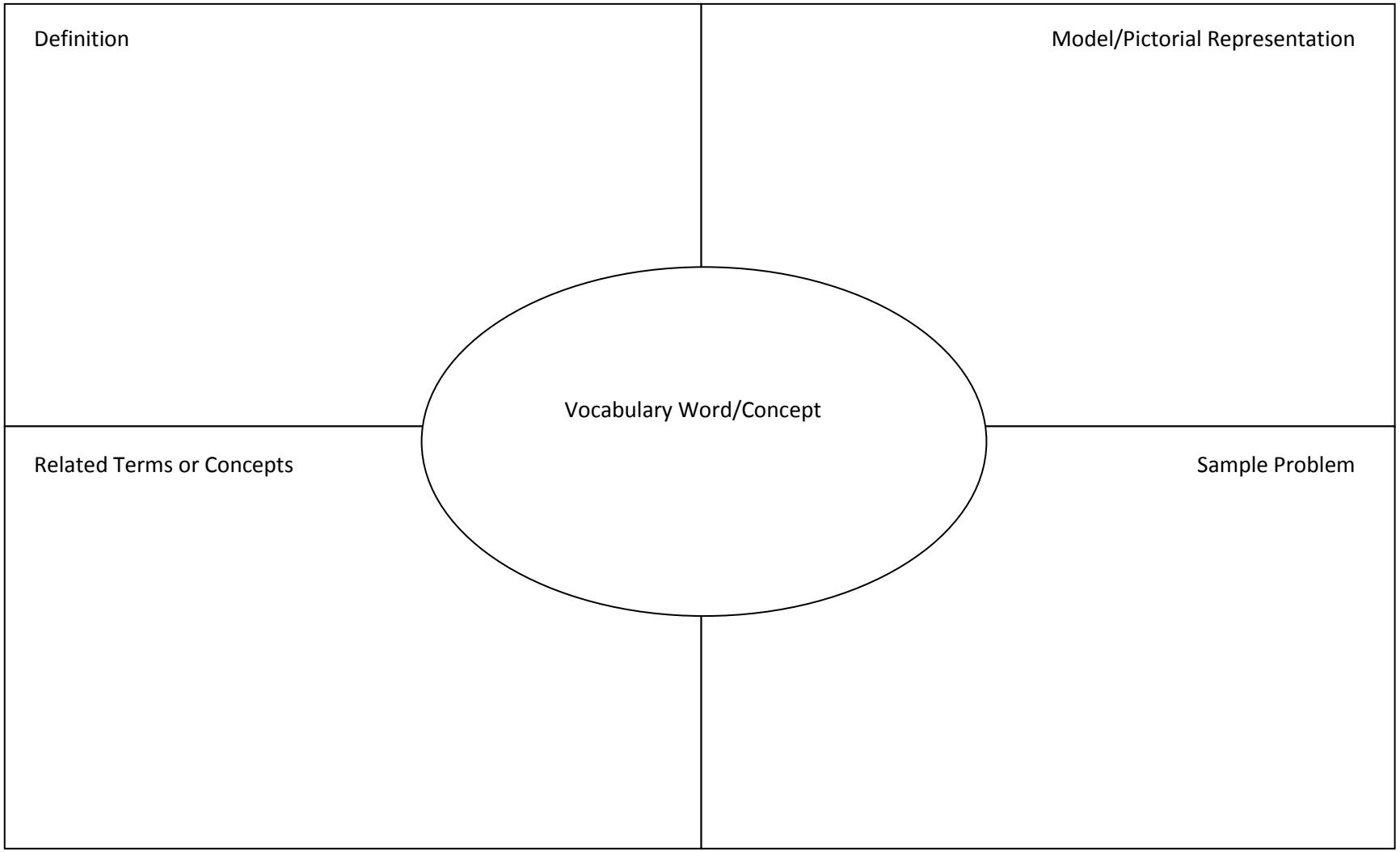
The traditional Frayer Model has students provide a definition, characteristics, examples, and non-examples of the term or concept. To help students make connections between terms and concepts and to learn through models and multiple representations, the *new spin* on the Frayer Model asks students to provide a definition, a model or pictorial representation, identify related terms and/or concepts, and to use the term or concept in a mathematics problem. Teachers may choose to customize the Frayer Model further by adding back in the non-examples when appropriate as well.

Promoting Student Learning

The modified Frayer Model promotes student learning by:

- Activating prior knowledge.
- Helps students clarify and communicate their understanding.
- Allows students to fill in the information with ideas, examples, etc. that make sense to them.
- Can be used as part of a Word Wall or in journals and used as reference for students as they work.
- Can be used as formative assessments.
- Can be completed at the beginning, during, or at the end of a lesson or unit.
- Should be shared as part of small and large group discussions so that students can add to what they have already written.

CONCEPT CARD: MODIFIED FRAYER MODEL



Group 3: *Instructional Implementation Sequence:* Attaining the CCSS Mathematical Practices Engagement Strategies

Instructional Implementation Sequence:
Attaining the CCSS Mathematical Practices Engagement Strategies

SAMPLE

Strategy	Description	Practice	Degree	Matrix Code
Think pair-share	Pair-Share, or Think-Pair-Share, is a strategy easy to implement in any classroom at any grade level or subject.	• Make sense of problems	• Explain their thought processes in solving a problem one way.	1a I

- See copies of the complete ***Instructional Implementation Sequence*: Attaining the CCSS Mathematical Practices Engagement Strategies** that have been provided.
- This is also available at: http://www.mathleadership.com/sitebuildercontent/sitebuilderfiles/instructseqchart5.4ccss.pdf
- Note: The last column of this table (the Matrix Code) links to another document by the authors entitled "Standards of Student Practice in Mathematics Proficiency Matrix. This matrix and further explanation of its purpose can be retrieved at: http://www.mathleadership.com/sitebuildercontent/sitebuilderfiles/standardsoftudentpracticeinmathematicsproficiencymatrix.pdf.

Group 4: Group Work and Decision Making

Helping Students Work in Groups

Teaching mathematics through the CCS provides opportunities for students to work with challenging mathematics tasks in different collaborative configurations: individually, in pairs, in small groups, and as a whole class. Each of the work arrangements can enhance student learning by providing opportunities to discuss the mathematics, to see other approaches to a problem, and to personalize the understanding for each student. The following are suggestions for making time spent in each work configuration beneficial to both the teacher and the students.

Large Group/Whole Class Work

At the beginning of the lesson:

- Pose the problem to students and as a large group determine what the problem is asking and have students in their own words explain what the problem is about.
- Have students brainstorm and chart for everyone a list of possible methods and/or tools that may be useful in solving the problem based on prior problem solving experiences.

At the end of the lesson:

- Allow students to present their work and talk through how they solved the problem(s).
- Make sure that different strategies are presented and help students to see the mathematical connections between each strategy.
- Focus students attention on the strategies used, not on the students presenting the strategy.
- Have students summarize the lesson from their point of view and fill in any gaps and call attention to new vocabulary used if students do not do this specifically.

Tip: Create rituals/routines for what is expected during whole class instruction so that students are able to focus their thinking. For example, if during the end of lesson whole group time you want students to ask questions of the student presenters, provide a list of question starters to students that they can use as a scaffold for creating their question.

Small Group/Pair Work

Working in small groups and/or in pairs allows students to work on challenging problems in a safe environment. However, there must be a balance between group work and individual accountability for learning.

Create guidelines that students will use every time they work collaboratively, such as:

- Move into your groups quickly.

- Allow each person to present their initial ideas about the problem before starting to work the problem out together.
- Don't interrupt a peer's presentation.
- If you are unsure or confused about something that is said, ask for clarification.
- Assign a number to each person in the group and then role a number cube and have that person present the group's work to the rest of the class. Other members of the group are free to assist in the presentation but the person who's number is called is the main presenter.
- Ask questions of each group member during the presentation.
- Remember that mistakes are part of the foundation of learning. We learn from our mistakes in the real world and we can learn from our mathematical mistakes as well.

Helping Students Make Decisions

When working alone or in large or small groups, students will come to a point in the lesson where they will have to make a decision about what to do to get started or what to do next. This is not always an easy step to take, especially for young students. Help students learn how to make decisions by doing the following:

- **Use Agreement Statements.** When someone presents an idea students may choose to agree or disagree with a statement or to state that they need more information. In addition, they are asked to describe their thinking about why they agree, disagree, or are unsure. As a group students can describe what they can do to investigate the statement by testing their ideas, examining what is already known, or using other means of mathematical inquiry.
- **Use Agreement Circles.** *Agreement Circles* provide a kinesthetic way to activate thinking and engage students in discussing and defending their mathematical ideas. Students stand in a large circle as the teacher reads a statement. The students who agree with the statement step to the center of the circle. Those who disagree remain standing on the outside of the circle. Those in the inner circle face their peers still standing around the outside circle and then divide themselves into small groups of students who agree and disagree. The small groups then engage in discussion to defend their thinking. This is repeated with several rounds of statements relating to the same topic, each time with students starting by standing around the large circle.
- **When making generalizations make a determination of Always, Sometimes, or Never True.** *Always, Sometimes, or Never True* involves a set of statements that students examine and decide if they are always true, sometimes true, or never true. This strategy is useful in revealing whether students over-generalize or under-generalize a mathematical concept. In addition, they are asked to provide a justification for their answer.

- **Have students look back.** If unsure of what steps to take when solving a problem, have students look back at what they have learned over a given instructional period of time. Students recount specific examples of things they know now that they didn't know before and describe how they learned them. This strategy provides students with an opportunity to look back on and summarize their learning. Asking students "how they learned it" helps them think about their own learning and the different ways, as learners, they are able to integrate new mathematical understandings.

(Keely & Tobey, 2011)

Next Steps

***Instructions**: Review your work during Module 2 and generate a list of implementation steps you would like to do, think you can do, challenges you might face, and ways to work around the challenges. Be prepared to share with the group.*

What do you think should be the next steps at your school to promote implementation of CCS-Math?
What can teachers do now to promote implementation of CCS-Math?
What are some expected challenges?
How can you work around and through the challenges?

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 am confident in my ability to assist teachers in their implementation of the CCS-Math Practice Standards.				
I understand and can communicate the implications of the language of the CCS-Math Content Standards.				
I can describe the progression of mathematical concepts and provide teachers with resources for identifying progressions at their grade level.				
I can promote and support teaching with cognitively rigorous tasks to meet the expectations of the CCS-Math Content Standards.				
I am aware of and can share multiple instructional strategies to teach the Content Standards through problem solving.				
I have a plan to support the implementation of the CCS-Math in my school and have identified solutions to potential challenges.				

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-2-6-12.

References

Balka, D., Hull, T., & Harbin Miles, R. (n.d.). What is conceptual understanding? Retrieved from http://www.mathleadership.com/sitebuildercontent/sitebuilderfiles/conceptualUnderstanding.pdf

Common Core State Standards Initiative 2011. *Toward Greater Focus and Coherence.* Retrieved from http://www.corestandards.org/Math

Common Core State Standards for Mathematics (2011). Retrieved from http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf

Common Core State Standards Initiative (2012). *K-8 Publisher's Criteria for the Common Core State Standards for Mathematics.* Retrieved from http://www.corestandards.org/assets/Math_Publishers_Criteria_K-8_Summer%202012_FINAL.pdf

Hess, K. (2009). Hess' Cognitive Rigor Matrix and Curriculum Examples: Applying Webb's Depth-of-Knowledge Levels to Bloom's Cognitive Process Dimensions – Math/Science. Reprinted with permission.

Hull, T., Balka, D. & Harbin Miles, R. (n.d.). Strategies Sequence Web. Retrieved from Leadership, Coaching, and Mathematics http://www.mathleadership.com/sitebuildercontent/sitebuilderfiles/strategyseqweb.pdf

Keely, P. & Tobey, C. (2011). *Mathematics Formative Assessment*. Thousand Oaks, CA: Corwin

McCallum, W. (2014). *Tools for the common core standards.* Retrieved from

McCallum, W. (2014). *Tools for the common core standards.* Retrieved from http://commoncoretools.me/author/wgmccallum/

Stein, M.K., Smith, M.S., Henningsen, M.A. & Silver, E. A. (2009). *Implementing Standards-Based Mathematics Instruction: A Case for Professional Development*, 2nd edition. New York: Teachers College Press.

Van de Walle, J., Karp, K., & Bay-Williams, J. (2013). *Elementary and middle school mathematics: Teaching developmentally*. (8th ed.). New York, NY: Pearson

Videos:

Joseph, S., *Zero Pairs, Manipulatives, and a Real-world Scenario.* From the Teaching Channel. Retrieved from https://www.teachingchannel.org/videos/teaching-subtracting-integers

Krasnow, A., *What's Your Sign: Integer Addition.* From the Teaching Channel. Retrieved from https://www.teachingchannel.org/videos/adding-integers-lesson-idea

McCallum, W., *Gathering Momentum for Algebra* from The Hunt Institute. Retrieved from https://www.youtube.com/watch?v=ONPADo_Nt14

McCallum, W., Zimba, J., *Mathematics Fluency: A Balanced Approach* from The Hunt Institute. Retrieved from https://www.youtube.com/watch?v=ZFUAV00bTwA

Meyer, D., *Math class needs a makeover* from TED.com. Retrieved from https://www.youtube.com/watch?v=NWUFjb8w9Psl