Connecticut Core Standards for Mathematics

Grades K–5

Systems of Professional Learning

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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 familiar with the Principles of Universal Design for Learning and the importance of flexibility and removing barriers to instruction.				
I understand the importance of incorporating UDL practices into lessons.				
I understand the difference between assessments of learning and assessments for learning.				
I know how to use formative assessment practices to make decisions about the next steps in instruction.				
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 Content Standards

Instructions: Discuss with your table group one positive highlight, one challenge, and one lesson learned from your personal implementation of the Content 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 Content Standards.

Positive Highlights

Ongoing Challenges

Lessons Learned

New Ideas for Implementing the CCS-Math Content Standards

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

New Ideas

Section 2

Section 2: Building a Teaching and Learning Framework through UDL
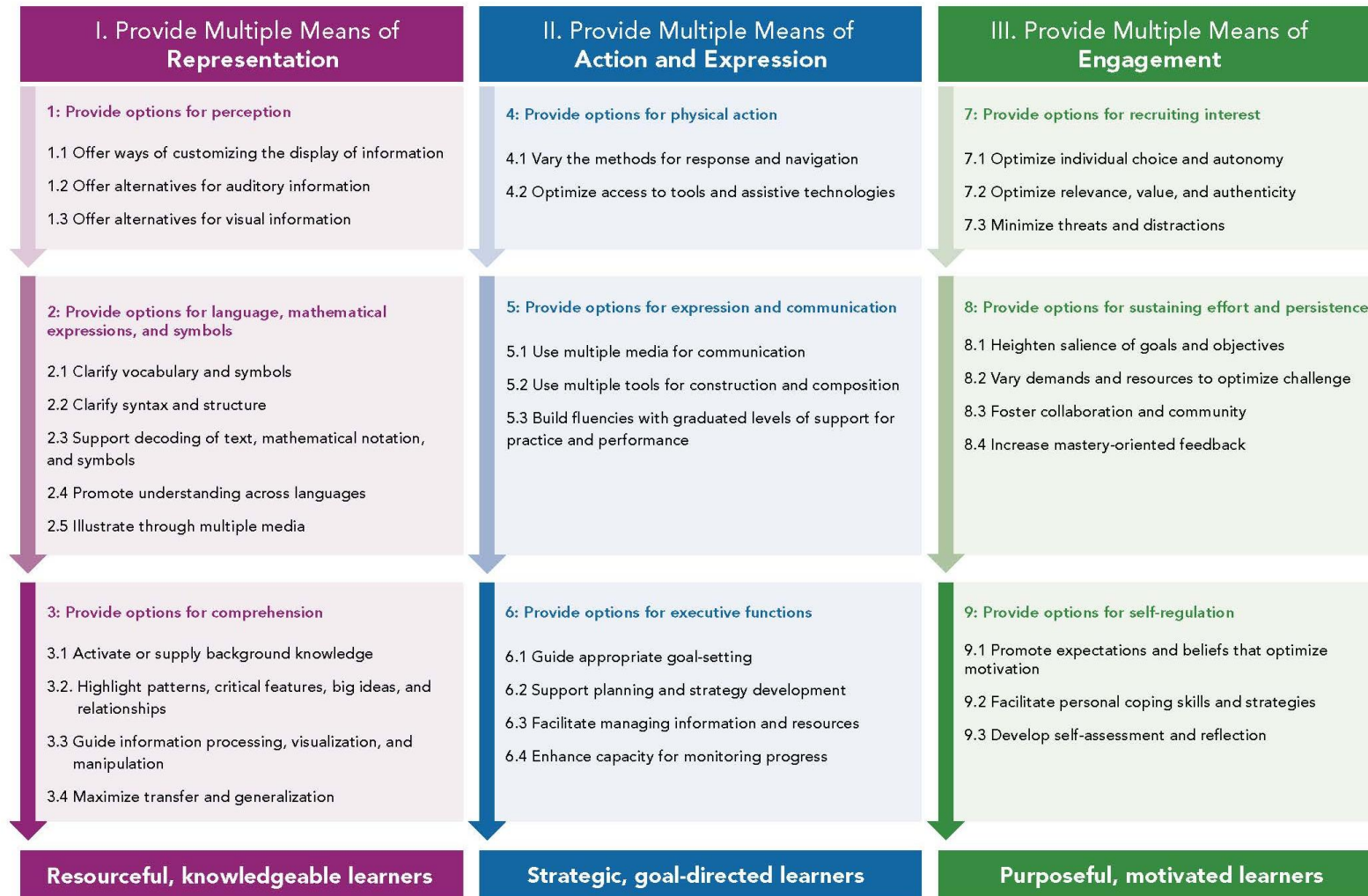
What is Universal Design for Learning?

Instructions: *Use the space below to take notes on the foundations of Universal Design for Learning.*

The UDL Principles		
Principle 1: Provide Multiple Means of Representation	**Principle 2:** Provide Multiple Means of Action and Expression	**Principle 3:** Provide Multiple Means of Engagement

Universal Design for Learning Guidelines

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

I. Provide Multiple Means of **Representation**	II. Provide Multiple Means of **Action and Expression**	III. Provide Multiple Means of **Engagement**
1: Provide options for perception	**4: Provide options for physical action**	**7: Provide options for recruiting interest**
1.1 Offer ways of customizing the display of information	4.1 Vary the methods for response and navigation	7.1 Optimize individual choice and autonomy
1.2 Offer alternatives for auditory information	4.2 Optimize access to tools and assistive technologies	7.2 Optimize relevance, value, and authenticity
1.3 Offer alternatives for visual information		7.3 Minimize threats and distractions
2: Provide options for language, mathematical expressions, and symbols	**5: Provide options for expression and communication**	**8: Provide options for sustaining effort and persistence**
2.1 Clarify vocabulary and symbols	5.1 Use multiple media for communication	8.1 Heighten salience of goals and objectives
2.2 Clarify syntax and structure	5.2 Use multiple tools for construction and composition	8.2 Vary demands and resources to optimize challenge
2.3 Support decoding of text, mathematical notation, and symbols	5.3 Build fluencies with graduated levels of support for practice and performance	8.3 Foster collaboration and community
2.4 Promote understanding across languages		8.4 Increase mastery-oriented feedback
2.5 Illustrate through multiple media		
3: Provide options for comprehension	**6: Provide options for executive functions**	**9: Provide options for self-regulation**
3.1 Activate or supply background knowledge	6.1 Guide appropriate goal-setting	9.1 Promote expectations and beliefs that optimize motivation
3.2. Highlight patterns, critical features, big ideas, and relationships	6.2 Support planning and strategy development	9.2 Facilitate personal coping skills and strategies
3.3 Guide information processing, visualization, and manipulation	6.3 Facilitate managing information and resources	9.3 Develop self-assessment and reflection
3.4 Maximize transfer and generalization	6.4 Enhance capacity for monitoring progress	
Resourceful, knowledgeable learners	**Strategic, goal-directed learners**	**Purposeful, motivated learners**

CAST

Universal Design for Learning Guidelines Worksheet

Instructions: Use the space below to organize your findings around your assigned guideline and to make notes about the other eight guidelines as they are presented.

Guideline 1: Provide options for perception	
Explanation	Examples

Guideline 2: Provide options for language, mathematical expressions, and symbols	
Explanation	Examples

Guideline 3: Provide options for comprehension	
Explanation	Examples

Guideline 4: Provide options for physical action	
Explanation	Examples

Guideline 5: Provide options for expression and communication	
Explanation	Examples

Guideline 6: Provide options for executive functions	
Explanation	Examples

Guideline 7: Provide options for recruiting interest	
Explanation	Examples

Guideline 8: Provide options for sustaining effort and persistence	
Explanation	Examples

Guideline 9: Provide options for self-regulation	
Explanation	Examples

Section 3

Section 3: Teaching and Learning with the UDL Principles

Identifying UDL Strategies–Video Observation

Instructions: As you watch the video, Multiplying Whole Numbers and Fractions, look for the instructional strategies being used to address the UDL Principles. Record the teacher actions and student actions you observed.

Note: The video can be found here: https://www.teachingchannel.org/videos/multiplying-fractions-by-whole-numbers-lesson.

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

Principle	Strategy Used
Principle 1: Provide Multiple Means of Representation	
Principle 2: Provide Multiple Means of Action and Expression	
Principle 3: Provide Multiple Means of Engagement	

5ᵗʰ Grade Lesson Outline

Instructions: *Use the following information as you discuss the 5ᵗʰ grade lesson.*

Standards being addressed:

- 5.NF.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.

- 5.NF.2: Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.

- SMP 1: Make sense of problems and persevere in solving them.

- SMP 3: Construct viable arguments and critique the reasoning of others.

- SMP 6: Attend to precision.

1. **Provide students with different versions of the task as needed.**

The task version 1:

Stuffed with Pizza
From NYC Department of Education

Tito and Luis are stuffed with pizza! Tito ate one-fourth of a cheese pizza. Tito ate three-eighths of a pepperoni pizza. Tito ate one-half of a mushroom. Luis ate five-eighths of a cheese pizza. Luis ate the other half of the mushroom pizza. All the pizzas were the same size. Tito says that he ate more pizza than Luis because Luis did not eat any pepperoni pizza. Luis says they each ate the same amount of pizza. Who is correct? Show all of your mathematical thinking.

The task version 2:

Stuffed with Pizza
From NYC Department of Education

Tito and **Luis** are stuffed with pizza! Tito ate one-fourth of a cheese pizza. **Tito** ate three-eighths of a pepperoni pizza. **Tito** ate one-half of a mushroom. *Luis ate five-eighths of a cheese pizza. **Luis** ate the other half of the mushroom pizza.* All the pizzas were the same size. **Tito** says that he ate more pizza than **Luis** because **Luis** did not eat any pepperoni pizza. **Luis** says they each ate the same amount of pizza. Who is correct? Show all of your mathematical thinking.

The task version 3:

Stuffed with Pizza

From NYC Department of Education

Tito and **Luis** are stuffed with pizza!

Tito ate one-fourth of a cheese pizza. **Tito** ate three-eighths of a pepperoni pizza. **Tito** ate one-half of a mushroom.

Luis ate five-eighths of a cheese pizza. **Luis** ate the other half of the mushroom pizza. All the pizzas were the same size.

Tito says that he ate more pizza than **Luis** because **Luis** did not eat any pepperoni pizza.
Luis says they each ate the same amount of pizza.

Who is correct? Show all of your mathematical thinking.

2. **Read the problem.**
3. **Clarify language:** *stuffed, cheese pizza, pepperoni pizza, mushroom pizza*
4. **Clarify the mathematics:** How can we represent one-fourth, three-eighths, one-half, five-eighths?
5. **Clarify facts:**
    a. How many pizzas are there in this situation?
    b. Who is eating the pizza?
    c. How much pizza did Tito eat?
    d. How much pizza did Luis eat?
    e. How big was each pizza?
6. **Check for understanding of the problem situation:** What is the problem asking you to determine?
7. **Activate prior knowledge and address possible misconceptions:** What strategies and/or tools have you used in the past to solve problems involving fractions (i.e., draw a picture, used fraction strips)? What do we know about working with fractions that might help us with this problem (i.e., when adding, make like denominators, when comparing fractions we cannot only look at the denominator

we also have to look at the numerator because the denominator tells us the size of the unit fraction but the numerator tells us how many of the unit fractions we have so while 1/9 may be smaller than 1/8, 5/9 is larger than 2/8)?

8. **Activate problem solving using strategies/tools from #7:** How might drawing a picture help me determine who ate more pizza? How might fraction strips help me determine who ate more pizza?

9. **Clarify expectations:** What does it mean to 'show all of your mathematical thinking'?

10. **Provide a process:** You will have 5 minutes of individual think time. Then in your groups each person will have 1 minute to discuss their personal thoughts on a strategy. Then the group will have 20 minutes to work together to solve the problem. Then we will end with each group having 5 minutes to present their work and discuss their solution or partial solution to the class. Provide time chart to each group.

Time	Step
5 minutes	Individual think time.
1 minute per person	Each person presents.
20 minutes	Group works together to solve the problem.
5 minutes per group	Group presentation time.

11. **Provide graphic organizer and checklist for students/groups to use while they work.** (Can be provided as a poster and/or as a separate handout as needed.)

Stuffed with Pizza		
What questions am I being asked to answer? Write them down.	What strategy or strategies can I use to solve the math word problem and answer all the questions? Write them all down.	How can I show all of my mathematical thinking and proof? Write it down.

Checklist		
After reading each question, check Yes or No	**Yes**	**No**
Did I read the math problem several times?		
Did I know what the problem was asking me to solve?		
Did I label my work correctly?		
Did I check all my computations?		
Did I show how I solved the problem?		
Did I show all of my mathematical thinking?		
Did I justify and defend my answers?		
Did I answer all the questions?		

Additional Notes:

Outlining a Lesson

Instructions: *Use the questions below to guide your thinking as you plan a lesson outline around an identified set of CCS-Math Standards.*

Questions to Guide Your Thinking
Adapted from NYC Department of Education

Concepts and Skills to Consider

- What ***CCS-Math Standard(s)*** for this grade is/are being addressed?

- What task is being used in the lesson?

- What concepts does the student need to know—*so that they will be able to complete the task successfully?*

- How will I prepare students who have not yet mastered these concepts—*so that they will be able to complete the task successfully*?

- What concepts will the student learn after the completion of task?

- What prerequisite skills does the student need to have mastered—*so that they will be able to complete the task successfully*?

- How will I prepare students who have not yet mastered these skills—*so that they will be able to complete the task successfully*?

- What new skills will the students have mastered upon completion of the task?

Provide Multiple Means of Representation

- How am I going to ensure that key information is equally perceptible by **all** students—*so that they will be able to complete the task/unit successfully?*

- How am I going to ensure accessibility, clarity, and comprehensibility for **all** students—*so that they will be able to complete the task/unit successfully?*

- How am I going to provide the necessary scaffolds to ensure that **all** students have access to knowledge and can assimilate new information—*so that they will be able to complete the task/unit successfully?*

Provide Multiple Means of Action and Expression

- Have materials been provided with which all students can interact, navigate, and express what they know—*so that they will be able to complete the task/unit successfully?*

- Have I provided alternative modalities for expression, to level the playing field and to allow all students the opportunity to express knowledge, ideas, and concepts in the learning environment—*so that they will be able to complete the task/unit successfully?*

- How have I provided necessary strategies and scaffolds for students to be more plan-full and strategic—*so that they will be able to complete the task/unit successfully?*

Provide Multiple Means of Engagement

- Have I provided alternative ways to recruit student interest, ways that reflect inter- and intra-individual differences among students—*so that they will be able to complete the task/unit successfully?*

- Have I provided options for students who differ in motivation and self-regulation skills—*so that they will be able to complete the task/unit successfully?*

- Have I provided alternatives to support students with different aptitudes and prior experience to effectively manage their own engagement and affect—*so that they will be able to complete the task/unit successfully?*

Section 4

Section 4: Supporting Teachers with UDL

Goal Setting and Next Steps

Instructions: Use the chart below to set goals for teachers around UDL and to plan the steps needed to help teachers meet the goal.

Key Idea of UDL
Implementation Goal 1
Steps to take to help teachers with meeting the goal

Key Idea of UDL

Implementation Goal 2

Steps to take to help teachers with meeting the goal

Additional Resources

Instructions: *Use the resources below to further your understanding about Universal Design for Learning.*

- Center for Applied Special Technology http://www.cast.org

- National Center on Universal Design for Learning http://www.udlcenter.org/

- The Universal Design for Learning Implementation and Research Network http://udl-irn.org/

- NYC Tasks, Units, & Student Work
  http://schools.nyc.gov/academics/commoncoreLibrary/tasksUnitsStudentWork/default.htm

Reflect

Instructions: *Answer the questions below as you reflect on your own CCS-Math implementation and your work with teachers at your school.*

1. What questions and/or concerns do you anticipate coming from the teachers you work with?

2. What are teachers doing now that you want to build off of as you introduce UDL?

Section 5

Section 5: Assessing Learning Progress

Two Interpretations of Division

Instructions: Solve the task below. Work first by yourself and then with your group. Be ready to present your solution strategy.

Two Interpretations of Division
from Illustrative Mathematics

Alignment: **3.OA.A.3**. Represent and solve problems involving multiplication and division.

Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

My Learning Goal:

Maria cuts 12 feet of ribbon into 3 equal pieces so she can share it with her two sisters. How long is each piece?

Maria has 12 feet of ribbon and wants to wrap some gifts. Each gift needs 3 feet of ribbon. How many gifts can she wrap using the ribbon?

Identifying UDL Strategies

Instructions*: Identify the UDL strategies that were/can be used when solving the Two Interpretations of Division task.*

What UDL strategies did you observe as you worked on the Two Interpretations of Division task?

Describing Assessment Goals

Instructions: *Use the space provided to describe your goals for classroom assessment.*

What are your goals for assessment?

Assessments 'of' and Assessment 'for' Learning

Instructions: Use the space provided to take notes on Assessments 'of' Learning and Assessments 'for' Learning.

NOTES:

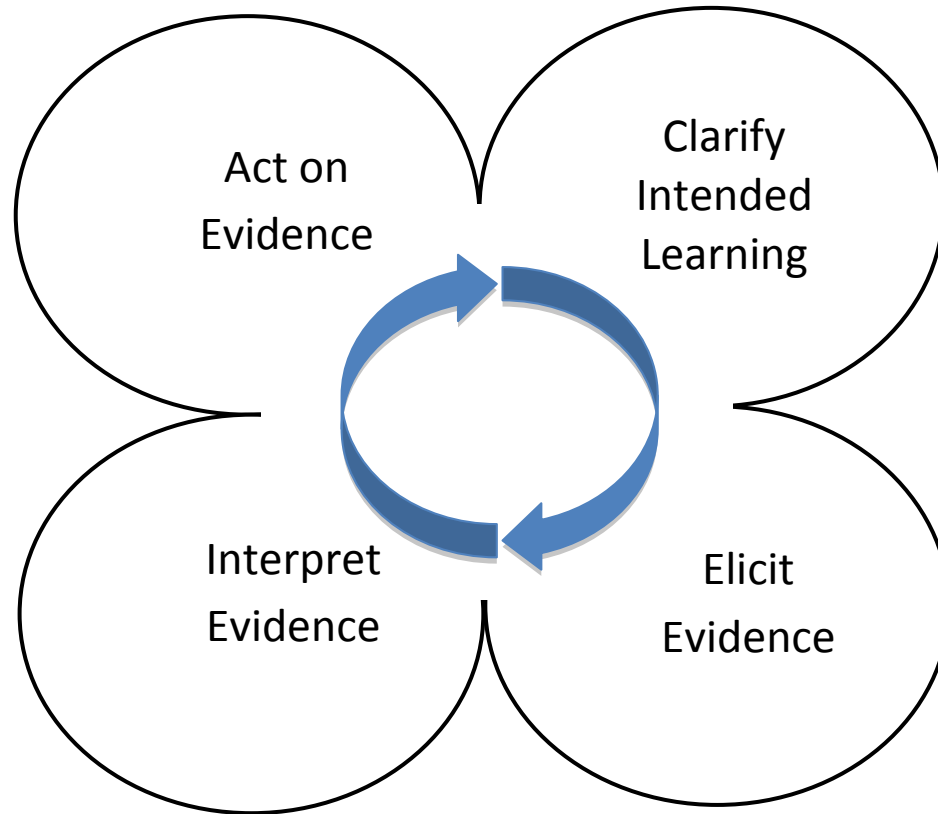| ASSESSMENTS of LEARNING	ASSESSMENTS for LEARNING

Attributes of Formative Assessment

Instructions: Use the space provided to take notes on the four attributes of formative assessment.

Four Attributes of Formative Assessment

NOTES:

NOTES:

Act on Evidence

Clarify Intended Learning

Interpret Evidence

Elicit Evidence

NOTES:

NOTES:

Reflecting on Formative Assessment

Instructions: *Reflect on the Two Interpretations of Division task that you did earlier and the tasks/questioning used in the Multiplying Whole Numbers and Fractions video. Jot down some notes below.*

Were targets and success criteria made clear?

Was the facilitator/teacher effective in eliciting evidence of student learning?

After evidence was interpreted, was actionable feedback given?

Section 6

Section 6: Students' Role in the Formative Assessment Process

Activating Students as Instructional Resources for One Another

Instructions: Review the techniques below to familiarize yourself with strategies that can be used to activate students as instructional resources for one another.

Practical Techniques:

1. **C3B4ME:** Before a student is allowed to ask the teacher for help, assistance must have been sought from at least three other students.

2. **Peer Evaluation of Homework:** Involve students in checking of homework. Possibilities that can be mixed up from day to day: students grade their own (rubric may be needed); students/groups swap papers/notebooks with another student/group.

3. **Homework Help Board:** Students indicate on the board any questions they had about the homework. Students who think they can help students who have questions about the homework are then encouraged to seek those students out and provide help.

4. **Two Stars and a Wish:** When a student gives feedback on another student's work, he has to provide two things he/she thinks were good about the work (the two stars) and a suggestion for improvement (the wish). These comments can be written on sticky notes and collected by the teacher.

5. **End-of-Topic Questions:** The teacher asks, "In your group, decide if there are any questions?" The teacher collects the questions, sorts them quickly, and deals with all the questions on the same issue at the same time.

6. **What Did We Learn Today?:** Break the class into groups 5 minutes before the end of class and ask each group to produce a list of things they have learned during the lesson. Each group then reports one thing they have learned to the class.

7. **Student Reporter:** A student is appointed as a reporter for the lesson. At the end of class, the student gives a summary of the main points of the lesson and tries to answer any questions that students in the class may have. If she/he can't answer the questions, then the reporter asks members of the class to help out.

8. **Preflight Checklist:** If there are a number of requirements for submitted work to satisfy, each student has their work signed off by a buddy who checks that all the required features are present.

9. **Group-Based Test Prep:** To prepare for a test, distribute to each member of a group a card on which a problem is written. The following day, each member presents their solution to the group and the rest of the group decides what needs to be added to the explanation to make it a good one.

Adapted from Wiliam, D. (2011). *Embedded Formative Assessment*. Bloomington, IN: Solution Tree Press (pp. 137-143).

Technique Sharing

Instructions: *Answer the questions below and determine which techniques you will bring back to the teachers at your school.*

Students' Role in the Formative Assessment Process

1. Activating students as learning resources for one another.

Which of the techniques indicated do you want to bring back to your setting? Others?

2. Activating students as owners of their own learning.

Which of the techniques indicated do you want to bring back to your setting? Others?

Section 7

Section 7: Moving Forward with the CCS-Math

Needs for Supporting the Implementation of the CCS-MATH

Instructions: Work collaboratively to identify coach and teacher needs around supporting the implementation of the CCS-Math. In the table below, write down implementation and support questions that you have–up to three needs for each stakeholder. You may want to refer back to those challenges you listed at the beginning of this module and support questions that were listed in the previous modules. As a group, write any common needs on a sticky note and place them on the appropriate chart paper.

COACH NEEDS	1.
	2.
	3.
TEACHER NEEDS	1.
	2.
	3.

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 familiar with the Principles of Universal Design for Learning and the importance of flexibility and removing barriers to instruction.				
I understand the importance of incorporating UDL practices into lessons.				
I understand the difference between assessments of learning and assessments for learning.				
I know how to use formative assessment practices to make decisions about the next steps in instruction.				
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-3-K-5.

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Video

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