

# CCSS Fraction Module 3: Connecting the Standards for Mathematical Practice to Fraction Instruction

## Facilitator's Notes

### Goal:

To develop a common understanding of the Standards for Mathematical Practice with specific connections to fraction content and rigor.

### Distribute to Participants:

- CCSS Standards for Mathematical Practice (<http://www.corestandards.org/the-standards/mathematics/introduction/standards-for-mathematical-practice/>)
- Chart paper and markers

### Supplementary Materials:

- [Personal Action Plan Template](#) handout
  - An optional template that can be distributed to each participant to facilitate personal reflection and planning with respect to fraction instruction based on the CCSS. It can be used as a supplementary closing activity for each of the six CCSS Fraction Modules. There are two versions of the template.
    - Initial Template – to be used after a participant completes his/her first module
    - Follow-Up Template – to be used after each subsequent module completed by a participants

### Directions:

1. Post the statement of purpose for the Standards for Mathematical Practice from the CCSS document: ***“The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.”*** (CCSS, 2010)
2. Ask participants to turn and talk about their understanding of what the quote means. It may prove helpful for many elementary teachers to make the connection between the “Good readers...” and “Good writers...” statements used in many classrooms during ELA instruction. These practices are what “Good mathematicians do”.
3. Direct participants to examine the first three words of each of the 8 mathematical practices and discuss what they notice. (*Mathematically Proficient Students...*)
4. Guide participants in counting off by eights and regrouping based on their number. Assign one of the Standards for Mathematical Practice to each group.
5. Instruct groups to read their assigned standard carefully and explore the verbs that illustrate the student actions for that practice following this protocol:
  - a. Circle, highlight, or underline the verbs for your assigned practice and discuss them with your group. *\*Some of the verbs that they should notice are:*

#1: Explain and make conjectures...	#5: Consider and detect...
#2: Make sense of...	#6: Communicate precisely to others...
#3: Understand and use...	#7: Discern and recognize...
#4: Apply and interpret...	#8: Notice and pay attention to...

- b. Create a poster for your assigned practice that includes:
    - i. 2-3 bullets showing the key ideas of the practice (limit to the most important)
    - ii. An example of what this practice would look like for fractions (What might students do in this content area that would demonstrate the use of this mathematical practice?)
    - iii. An example of how to assess a student's progress with this particular practice (How will you know if a student is developing this mathematical ability?)
  - c. Groups will share their posters with the larger group.
6. Close by encouraging participants to share out one idea of how they will incorporate the Standards for Mathematical Practice into their fraction instruction.

## Activities and Tools to Extend Your Study:

### 1. Unpacking The Practice Standards:

- a. Distribute the following by grade level:
  - I. *North Carolina Unpacked Standards for Math*  
(<http://www.dpi.state.nc.us/acre/standards/common-core-tools/#unmath>)
  - II. EDC: Think Math – *CCSS Mathematical Practices*  
([http://thinkmath.edc.org/index.php/CCSS\\_Mathematical\\_Practices](http://thinkmath.edc.org/index.php/CCSS_Mathematical_Practices))
- b. Arrange participants into grade level groups and distribute the documents from North Carolina and the EDC that describe what the Standards for Mathematical Practice would look like at their grade level. It may help to have participants concentrate on the practice which they read during the original session, especially for the EDC document. They can then jigsaw the information in their grade level groups.
  - I. Direct participants to independently read through the documents and highlight the key ideas and content connections that they find.
  - II. Discuss findings in small groups.
  - III. Invite grade levels to share out with the larger group.
- c. Ask participants to look back at the examples they created for their posters during the original session and modify them based on their new knowledge.

### 2. Connecting Practices and Rigor:

- a. Distribute copies of [Webb's Depth of Knowledge Chart](#) to participants and post the two quotes found below.
- b. Have participants watch the Karin Hess video about Depth of Knowledge (<http://vimeo.com/20998609>) and then discuss the key points. Be sure to make connections to the practice standards.
 

*Two of the key ideas from the video are that:*

  - I. *the verb doesn't determine the complexity, what comes after the verb does; ie: "describe" doesn't tell you how complex a task is, what you are being asked to "describe" does*
  - II. *tasks should be modified for difficulty, but not complexity; all students need access to complex tasks, so the complexity should remain the same for all students, but the difficulty (range of numbers, graphic organizers, etc.) should be adapted to ensure equal access to the tasks for all learners*
- c. Post and share the following two quotes with participants and then have them discuss in their small groups whether or not all students have the opportunity to engage in mathematical tasks that promote students' attainment of the mathematical practices on a regular basis.
  - *"Not all tasks are created equal, and different tasks will provoke different levels and kinds of student thinking." Stein, Smith, Henningsen, & Silver, 2000*

- “The level and kind of thinking in which students engage determines what they will learn.” Hiebert, Carpenter, Fennema, Fuson, Wearne, Murray, Oliver, & Human, 1997
- d. Encourage participants to look back at the examples they created for their posters during the original session and modify them to make sure that they represent a high level of rigor and engagement.
  - e. Close by soliciting participants to share the changes they made to their examples and the thinking behind those changes. Also ask participants to talk about how they will bring this thinking back to their classrooms.

### 3. PARCC and the Standards for Mathematical Practice:

- a. Distribute copies of the PARCC document to participants and have them turn to their grade level section. (<http://www.parcconline.org/sites/parcc/files/PARCCMCFfor3-8MathematicsFall2011Release.pdf>)
- b. Direct participants to look through their grade level section and highlight connections between fraction standards and the Standards for Mathematical Practice.
- c. Reconvene as a whole group and ask participants to share the connections that they found at their grade levels.
- d. Close by having participants talk about how they think the Standards for Mathematical Practice might be assessed on the PARCC in the fraction domain. *What might the assessors be looking for? What should I be looking for in my classroom?*

### 4. Bringing the Standards for Mathematical Practice to the Classroom:

- a. Begin the session by reviewing the posters that were created during the original session for each of the 8 Standards for Mathematical Practice and the key ideas from each that need to be brought back to the classroom.
- b. Point out the research shows that clear learning targets that students understand are the key to meaningful lessons and cognitive growth. Ask: *How does this knowledge connect to the Standards for Mathematical Practice? How can we make these practices come alive in our classrooms and be meaningful to our students? Ask the group to brainstorm possibilities and record them on chart paper.*
- c. *After discussing their suggestions, present the group with the following options and provide them time to work individually or in small groups. Remind participants that they can use their group posters from the original session as a resource to aid them in this work.*
  - I. *Investigate the possibility of creating student friendly posters for each of the Standards for Mathematical Practice by exploring this link:*  
<http://wsesucoachescorner.files.wordpress.com/2012/05/mathematical-practices-posters-from-utah.pdf> Participants selecting this option should also consider how they can create and/or use these posters with students.
  - II. *Create a bank of effective questions that can be used to foster the development of the habits of mind outlined by the Standards for Mathematical Practice. Challenge them to design questions that may be especially relevant during fraction instruction. As an aid to their discussion, it may be helpful to provide them with the samples given on the [Questions to Ask That Move Students to Become Mathematically Proficient](#) handout.*
  - III. *Act upon one of the suggestions discussed in the brainstorming session. Design a protocol that may be helpful to fellow educators.*
- d. *Reconvene the whole group to share small group or individual efforts.*

### 5. Connecting Tasks and the Standards for Mathematical Practice:

- a. Distribute copies of the grade 4 task from NYC’s Common Core Aligned Tasks, [Farmer Fred](#).
- b. Instruct participants to complete the task independently.
- c. Ask participants to form small groups to discuss which Standards for Mathematical Practice are most closely related to this task. Another way to frame the discussion is to ask participants which practices could most easily be assessed by the completion of this task?

Be sure to note for participants that most of the practices can be related to every mathematical task, but encourage them to agree on 2 or 3 that they feel would be best to focus on for this particular task.

- d. Distribute copies of the annotated student work for this task which starts on page 14 of the packet. [http://schools.nyc.gov/NR/rdonlyres/04CC9ECB-C5AB-47DA-891B-6D8F6B6EFE88/0/NYCDOEG4MathFarmerFred\\_Final.pdf](http://schools.nyc.gov/NR/rdonlyres/04CC9ECB-C5AB-47DA-891B-6D8F6B6EFE88/0/NYCDOEG4MathFarmerFred_Final.pdf) it is advisable to select just one or two of the student samples for everyone. This will help simplify the discussion at the end. The samples rated as practitioner or apprentice levels will lead to better discussions than those from the expert level.
- e. Direct participants to evaluate the work of one or two students for proficiency with the Standards for Mathematical Practice agreed upon by the group. Be sure to note for participants that they are assessing this student's proficiency through the lens of the specific practice(s), not their completion of the task as a whole.
- f. Call groups to come back together to share out the Standards for Mathematical Practice that they chose and their thoughts about the student's proficiency in regard to these practices.
- g. Close by asking participants to talk about how they will bring this type of thinking and analysis back to their classroom, or if appropriate how they could continue to do this as a PLC.