College and Career Readiness Standards-in-Action

ADVANCED UNIT

2

WORKSHOP MATERIALS
MATHEMATICS

FOCUSING ON ASSIGNMENTS AND STUDENT WORK

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TABLE OF CONTENTS

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FEEDBACK CHECKLIST FOR TEAM MEMBERS[1]

I will… **I did…**

- ☐ Provide feedback on the strengths and accomplishments of the assignment, as well as on its weaknesses and on areas where it can be strengthened.
- ☐ Give feedback in a manner I would like to receive it.
- ☐ Focus on the assignment, rather than on judgments about my colleague as a person or a professional.
- ☐ Demonstrate support for my colleague when providing feedback by using nonjudgmental language and a supportive tone of voice and body language.
- ☐ Avoid overwhelming my colleague with more feedback than is needed. Encourage my colleague to let me know when it is difficult to hear my feedback.
- ☐ Be as specific as possible, suggesting instructional approaches, resources, etc., to improve the assignment.
- ☐ Leave my colleague feeling helped, motivated, and inspired.

FEEDBACK CHECKLIST FOR PRESENTING INSTRUCTOR

I will… **I did…**

- ☐ Stay open and receptive to comments and reflections from my colleagues. Focus on inquiry rather than advocacy. (Avoid becoming defensive.)
- ☐ Demonstrate support nonjudgmental language and a supportive tone of voice and body language as my colleagues provide feedback.
- ☐ Focus on improving the assignment, rather than on viewing suggestions as criticism of my professional skills.
- ☐ Participate actively in re-envisioning a stronger and more aligned assignment.

[1] Adapted from Westberg, J. and Hilliard, J. (1994). *Teaching Creatively with Video: Fostering Reflection, Communication, and Other Clinical Skills.* New York: Springer Publishing.

CCR SIA STUDENT WORK PROTOCOL FOR MATHEMATICS

Presenting Instructor:

Level of Learning: **Date:**

This protocol is designed to evaluate the quality of student assignments and their alignment with the CCR standards. For each step in the process, use the guiding questions to stimulate and inspire discussion and to determine a set of findings.

Step 1: Analyze the purpose and demands of the assignment (without consulting other materials, such as the standards or student work). (10–15 minutes)

Take time individually and then collectively to develop a focused understanding of the assignment. Take the assignment at face value and do not assign to it purposes or demands that are not readily evident.

Guiding Questions:

- What do you think students would learn from completing this assignment?
- Why might an instructor give this assignment?
- Is it clear what students need to know and be able to do to successfully complete the assignment?
- Which mathematical practices might be observed in completing the assignment?
- What will students actually learn from working on the problem(s) and answering the question(s) in this assignment?

Notes and observations on the purpose and demands of the assignment:

Step 2: Select the CCR standards that best match the assignment's demands. (10–15 minutes)

Examine the assignment and its supporting instructional materials: answer keys, scoring guidelines, and/or rubrics. Remember to consider all domains of the CCR standards.

Guiding Questions:

- Which level-specific CCR standards (up to four) best match the content and performance demands of the assignment (identified in Step 1)? Are there any gaps between the demands of those standards and the assignment?
- Is the assignment more closely aligned with CCR standards from a lower or higher level? (If it intentionally contains components that are designed to review content from lower levels, or if it does not clearly fit any CCR standard, go to Step 4.)
- Is one or more of the following key instructional advances, listed below, evident in the assignment?
  - **Focus:** Does the assignment address the Major Work of the Level (MWOTL)? Does it provide on-level problems and activities that are tied to the MWOTL?
  - **Rigor:** Does the assignment pursue conceptual understanding, procedural skill, and/or fluency?2

Alignment Descriptors: Rate alignment for every standard identified as a target for the assignment.

ALIGNMENT OF THE ASSIGNMENT WITH THE IDENTIFIED CCR STANDARD(S) FROM THE TARGETED LEVEL OF LEARNING		
3	EXCELLENT	The demands of the assignment are clearly consistent with all aspects of the content of the identified standard(s).
2	STRONG	The demands of the assignment are consistent with the *most critical* aspects of the identified standard(s). However, some of the *less critical* aspects of the standard(s) may not be addressed.
1	WEAK	The assignment demands do ***not*** address the *most critical* aspects of the identified standard(s). However, some of the *less critical* aspects of the standard(s) are addressed.
0	NO ALIGNMENT	No CCR standards match the demands of the assignment.

[2] Coherence—the third key advance in mathematics—deals with how lessons and units connect. It is not likely to be able to identify coherence in a single assignment. However, in the redesign of the assignment, the group may want to consider the prerequisite content students need to complete the assignment and how the assignment connects to future learning.

Notes, observations, and alignment ratings on the CCR standards that best match the assignment, including the Mathematical Practices:

State whether one or more of the instructional advances are represented in the assignment. If so, explain how:

Note gaps between the demands of the selected standards and the assignment:

Step 3: Analyze student work. (20–25 minutes)

Work *individually* to answer the questions in the following table for each student work sample.

Student Work Sample	(1) What does the student's work demonstrate about the depth of his/her understanding of the content?	(2) What does the student's work demonstrate about his/her proficiency with the demands of the targeted CCR standards, including the Standards for Mathematical Practice?	(3) According to the scoring guidelines and answer keys, what is the student's proficiency regarding the targeted CCR standards? (If no scoring guidelines are provided, mark with N/A.)
Student #_____			
Student #_____			
Student #_____			

Student Work Sample	(1) What does the student's work demonstrate about the depth of his/her understanding of the content?	(2) What does the student's work demonstrate about his/her proficiency with the demands of the targeted CCR standards, including the Standards for Mathematical Practice?	(3) According to the scoring guidelines and answer keys, what is the student's proficiency regarding the targeted CCR standards? (If no scoring guidelines are provided, mark with N/A.)
Student #_____			
Student #_____			
Student #_____			

Work *collectively* to compare your responses in the chart above and then to answer the following questions about the patterns seen across the collection of student work samples.

Guiding Questions:

- What does the pattern of student responses show about students' understanding of the mathematical context of the assignment?
- What are the most frequent and fundamental problems students appear to have with the assignment? Are there common errors made across the collection of student work? What do the patterns across multiple student work samples demonstrate about the clarity and alignment of the assignment (i.e., the directions, scoring guidelines, and supporting materials?)
- In what ways does the assignment allow (or not allow) students to demonstrate various levels of proficiency with the targeted standards?
- What does the student work tell us about the kind and level of knowledge and skills students have learned and still need to learn? What are the implications of the findings regarding needed additional instruction or re-envisioning of the assignment?

Notes and observations on the patterns across the student work samples:

Step 4 : Redesign and strengthen the assignment. (15–20 minutes)

Review your notes from Steps 1–3 to decide collectively how to strengthen the assignment (what to keep, delete, or add) so that it more closely aligns with the CCR standards.

Guiding Questions:

- If you determined the assignment was aligned to standards from a lower level of learning or it was weakly aligned with the identified CCR standards (score of 1) from the targeted level of learning, determine how the assignment be strengthened? Use the content of the selected standards more than the specifics of the original assignment to guide the redesign.
- If only one standard from the targeted level of learning aligns with the original assignment, which standards could be added to enrich the assignment? (In mathematics, if the assignment is tightly focused, the answer to this question may be "none.")
- What prerequisite knowledge do students need to complete the assignment? What are the assignment's connections to future learning?
- If the assignment is already well-aligned with the identified CCR standards from the targeted level of learning (mainly scores of 2 and 3) and students did well, how might the assignment be re-envisioned to challenge students further? In what ways could a re-envisioned assignment promote higher levels of active problem- solving, reasoning, and critical thinking?
- If the assignment is already well-aligned with the identified CCR standards from the targeted level of learning (mainly scores of 2 and 3) but students did not do well, what supportive instructional approaches might help students reach the proficiency? (Consider how to reconfigure the lesson to address common errors and misconceptions.)

Suggestions for improving the assignment:

Suggestions for improving the accompanying instructional approaches:

REDESIGNED ASSIGNMENT FOR MATHEMATICS

Assignment Title: **Level:**

Which CCR content and practice standards are addressed in this assignment?

1.

2.

3.

4.

Write the redesigned CCR-aligned assignment below. (This could include revisions to the prompts or directions, adjustments to the way questions are asked, or changes to scoring guidelines.)

Summarize the instructional approaches recommended for this assignment. (Include the prerequisite content that students need in order to complete the assignment and how the assignment connects to future learning.)

APPENDIX: CONDUCT A LESSON STUDY

LESSON STUDY GUIDE[2]

Step 1: Create or Redesign the Lesson.

Determine the goal of the Lesson Study group and situate the goal within a sequence of learning. Use the Guide to Develop a Mathematics Lesson for Lesson Study to record key elements.

Step 2: Teach and Observe the Lesson.

- Support the natural atmosphere of the classroom while you observe:
  - Arrive early and stay in the classroom during the entire lesson to capture how the lesson is set up, its flow, and the conclusion.
  - Minimize your interactions with students so as not to disrupt them.
  - Circulate freely when students are working individually or in groups (if you cannot hear students or need to see their work); otherwise, move to the side or back of the room during whole-class discussion.
- Assume the role of a researcher—collecting data on the lesson—rather than an evaluator of the instructor teaching the lesson.
- Make observations about the lesson plan itself. Take notes that focus on the goals and activities of the lesson.

Step 3: Debrief the Lesson.

Within days of the observation, reassemble the group to discuss the lesson and share your observations. Give the instructor who taught the lesson the first opportunity to offer reactions to the lesson. Comment on specific aspects of the lesson and support feedback with concrete evidence:

- Were the lesson goals clear?
- Did the lesson sufficiently target the college and career readiness standards (the student knowledge and skills that are the focus of the lesson goals)?
- Did the activities support achieving the goals?
- Was the flow of the lesson coherent?
- What did student responses, presentations, or discussions indicate about what they were learning?

[2] Ertle, B., Chokshi, S., and Fernandez, C. (2002). Lesson Study Tools. New York: Columbia University/Lesson Study Research Group. Retrieved September 11, 2009, from http://www.tc.columbia.edu/lessonstudy/tools.html; Makoto, Y., Chokshi, S., and Fernandez, C. (2001). Sample Lesson Plan Format. New York: Columbia University/ Lesson Study Research Group.

Step 4 : Revise and Re-Teach the Lesson.

Revise the lesson based on the observations and analysis, and select another member of the group to teach the revised lesson.

Step 5 : Document and Disseminate the Lesson.

After the revised lesson is taught and observed, assemble the group again. The instructor who taught the revised lesson should report on the success of the revised lesson and what students have learned. This includes identifying and discussing 1) the progress that various classes of students made toward meeting the Lesson Study goal; and 2) the knowledge they gained and skills they learned along the way.

Step 6 : Add the Improved Lesson to a Resource File.

A member of the workgroup (could be the presenting instructor) should use the Mathematics Lesson Development Checklist to serve as a final quality check of the lesson they developed. Then they should add that lesson to a resource file for instructors in their program to use. This may be an electronic file so that teachers can easily download, share, and update the improved version of the assignment.

GUIDE TO DEVELOP A MATHEMATICS LESSON FOR LESSON STUDY

Date and time the lesson will be taught: _____

Instructor: _____

Classroom: _____

1. Set up the lesson and establish the learning goals:

What are the learning goals for students in this lesson? What must students know and be able to do to meet the goals?

How long should this lesson take to complete (e.g., number of class sessions or hours)?

What is the intended level of this lesson?

2. Identify the level-specific CCR mathematics standards that are the targets of the lesson:

What 3-4 CCR content standards are targeted in the lesson?

Do they represent the Major Work of the Level (MWOTL)?[3]

3. Identify the Standards for Mathematical Practice that are central to the goals of the lesson:

What specific Standards for Mathematical Practice are central to the goals of this lesson?

How can students' abilities to apply those practices be observed and assessed?[4]

[3] Use the CCR Content Progressions to assist with the selection and identification of content for items 2 and 4.
[4] Use the Standards for Mathematical Practice to assist with the selection of practices for item 3.

4. Address how the lesson contributes to coherence:

Have academic vocabulary words been identified from the text that demand attention and are related to the big ideas?

What foundational knowledge is needed for successful learning in this lesson?

How do concepts acquired in this lesson support future learning?

5. Address rigor:

Which aspect(s) of rigor are required by the targeted standards?

Do the tasks and activities of the lesson address those aspects?

What thought-provoking problems or tasks is the whole class asked to solve?

On which problems or tasks will students work independently, or with a partner or small group?

6. Include essential mathematical vocabulary:

What explanations, representations, and examples are needed to make the mathematics of this lesson clear?

7. Identify discussion questions that allow students to share their thinking:

When will student sharing happen in this lesson?

What are the discussion questions and the expected responses to the discussion questions?

8. Develop checks for understanding:

What strategies and opportunities will be used to check for student understanding throughout the lesson?

MATHEMATICS LESSON DEVELOPMENT CHECKLIST

This checklist is designed to serve as a final quality check of the lesson developed for your Lesson Study.

1. Learning Goals for Students:

☐ Student learning goals are identified.

☐ Requisite knowledge and skills are identified.

2. Level-Specific CCR Mathematic Content Standards:

☐ The lesson targets standards that represent the MWOTL.

☐ The focus of supporting work is on enhancing the MWOTL.

3. Targeted Standards for Mathematical Practice:

☐ At least one and no more than four Standards for Mathematical Practice are targeted.

☐ There are descriptions about how to make meaningful connections between the content and the selected Standards for Mathematical Practice.

4. Coherence:

☐ Foundational knowledge is clearly identified.

☐ Connections are made as to how the content of this lesson supports, and is connected, to future learning.

5. Rigor:

☐ Problems and tasks reflect the lesson's targeted aspects of rigor.

☐ Tasks and activities address conceptual understanding.
Examples of words that may signal conceptual understanding are: "understand," "interpret," "recognize," "describe," and "explain."

☐ Tasks and activities address procedural skill and fluency.
Examples of words that signal procedural skill and fluency are: "fluently," "compute," "convert," and "rewrite."

☐ Tasks and activities address application. Examples of phrases that signal applications are: "real world" and "word problems."

☐ Directions are provided on when the problems should be solved independently, with partners or small groups, or as a whole class.

6. Mathematical Vocabulary:

☐ Mathematical terms important to the concepts of the lesson are identified and defined.

☐ Examples, such as explanations, diagrams, graphs, and/or charts, are included to provide a clear understanding of the mathematical language, situation, or context.

7. Discussion Questions:

☐ High-level discussion questions are provided to encourage deep mathematical thinking.

☐ Expected sample student responses and suggestions for interpreting those responses are provided.

8. Checks for Understanding:

☐ Formative and self-assessments that are connected to the lesson's goals are included.

☐ Summative lesson or unit assessments that are connected to the lesson's goals are included.

☐ Answer keys are provided for all assessments, along with rubrics or guidelines for interpreting student performance, when needed.