GUIDELINES FOR SPECIFYING PROBLEM OF PRACTICE & DEFINING SCOPE OF WORK

Date & time of next cohort meeting: _____

GUIDELINES	NOTES
Briefly describe the general problem of practice	Teaching reasoning skills.
Briefly describe the more specific problem of practice that will be your cohorts' focus.	In our geometry classes, students don't seem to be able to *use* the theorems we've proved in new or different situations (either new theorems or problem solving). The purpose of proving the theorems was to help them understand the properties that must be true when certain conditions are met, but they don't seem to have gained that understanding in a way that allows them to use the properties for reasoning in new situations.
List the CCSS content and practice standards tied to your area of focus.	SMP 1: Make sense of problems and persevere in solving them SMP 3: Construct viable arguments and critique the reasoning of others G-C Understand and apply theorems about circles.
Why is this area of focus essential to successful student transitions from high school to college?	Students need to learn how to make connections when studying mathematics: critically thinking about what they have learned and how they can apply it, asking and explaining to themselves why the conditions of a theorem lead to the conclusions, and using mathematical reasoning to make sense. This ability to critically think about math and a disposition to make sense will help them become stronger independent and interdependent math learners, necessary for success in college.
How will adjustments to this area of focus accomplish the goals of the grant: -increase first-year college level pass rates in introductory math or composition? -increase placement into college-level course work? -decrease need for developmental course work?	A focus on improving these skills in high school and introductory college classes should help increase pass rates because students will be better prepared to support their own learning through improvement of critical thinking and sense-making about math.

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What background information will you need to begin to make informed adjustments to this area of focus? -Where is this focus area addressed in the curriculum? -How is it addressed in the curriculum? -When is it addressed in the curriculum? -What are the performance expectations at the high school and college levels? -How well do these expectations align?	What does research say about how students learn to reason mathematically? More specifically, what does research say about students' development of understanding of what a theorem is and students' ability to use proofs as a way to understand mathematical ideas? According to the CCSS, making sense and reasoning should be included in all of learning mathematics, but it is only stressed in our book in the chapter on writing proofs. In high school, students are expected to write formal proofs by the end of Geometry, however, in college, they are not expected to write formal proofs unless they become a math major. Learning math with understanding requires students to regularly use informal reasoning. Other disciplines may require quantitative reasoning at varying levels of formality. Expectations for alignment are in the ways students make sense of math, including critical thinking specific to mathematics (questioning our assumptions, justifying our assertions, etc).
Once you have evidence to show the more specific challenges associated with improving learning and teaching in this area of focus, how will you intervene?	We will analyze our data on how students made sense of a particular mathematical idea (the construction of the incenter of a triangle) to identify particular critical thinking and independent/interdependent learning skills we think students needed to apply in order to improve their sense-making of and ability to use the relationships. Together, we'll brainstorm ways to teach these skills, come up with a new topic, and test our ways of teaching these skills with the new topic.
How will you evaluate your interventions?	We will collect and analyze data on the new topic in much the same way as we did for the earlier data, to see if students' critical thinking and learning skills changed in any way.

NOTES

SUMMARY PROBLEM STATEMENT

Develop students' awareness of the need to use mathematical reasoning, and ability to use mathematical reasoning to deepen their understanding of mathematics.

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ANTICIPATED PRODUCTS

Lesson Study focused on improving students' reasoning skills in geometry (more specific focus yet to be determined).

WORK PLAN OUTLINE

We each look for and log evidence of student reasoning and lack of student reasoning in our classrooms for the next month, collecting copies of student work (names removed) to provide to each other as evidence.

Meet in early March via Canvas to share and discuss our evidence, and decide on a particular mathematical focus for our Lesson Study. Spread out the work of gathering research and ideas related to this focus.

Meet again in April (in person or on Canvas) to discuss what we have learned and to outline the work of the Lesson Study.