

**Early-Phase Competition Absolute Priority 3 (STEM)
Riverside County Office of Education
S411C230040
Making Connections in Mathematics (MCM) project**

Applicant Name: Riverside County Office of Education

Project Title: Making Connections in Mathematics: Empowering Students by Empowering Teachers (MCM) project

Type of Grant Requested: (select one) Early-Phase Mid-Phase Expansion

Absolute Priorities the Project Addresses: (select all that apply)

Absolute Priority 1-- Demonstrate a Rationale (Early), Moderate (Mid), Strong (Expansion)

Absolute Priority 2-- Field-Initiated Innovations—General

Absolute Priority 3-- Promoting STEM Education

Absolute Priority 4-- Meeting Student Social, Emotional, and Academic Needs

Absolute Priority 5-- Educator Recruitment and Retention

Competitive Preference Priorities the Project Addresses: (select all that apply)

Competitive Preference Priority 1— Promoting Equity in Student Access to Educational Resources and Opportunities: Implementers and Partners

Competitive Preference Priority 2—Supporting a Diverse Educator Workforce and Professional Growth to Strengthen Student Learning* (FOR EARLY-PHASE AP5 APPLICANTS ONLY)

Total number of students to be served by the project: 3,000 students and over 100 teachers

Grade level(s) to be served by the project: 11th grade mathematics

Definition of high-need students: High percentage of students who either receive free or reduced lunch or are designated English Learner, homeless, or foster program eligible (over 71%). Students that are underrepresented in STEM fields. Students that are falling behind in high school to such an extent that they cannot survive and flourish in college.

Brief description of project activities: We will develop a grade 11 math course to accelerate learning of underperforming 11th grade high school math students in order to meet grade-level expectations, positively influence students' mathematical identities, and increase teachers' mathematical agency. To accomplish this, MCM course, and corresponding Professional Learning series, will build teacher capacity in the use of the eight mathematics teaching practices defined in NCTM's Principles to Action to design instruction that: engages students in mathematical discourse as the vehicle for learning; builds thinking classrooms; uses technology to enhance learning; and engages teachers and students in the formative assessment process.

Summary of project objectives and expected outcomes: At least 100 teachers will be trained by project completion. MCM teachers will increase their ability to implement empowering instructional strategies into math classrooms. MCM students will demonstrate improved perception of their math abilities and confidence in taking college-level math courses. MCM students will demonstrate a significantly higher mathematics achievement measured by grade 11 SBAS test. Increase the number of Inland Empire teachers receiving MCM training and the number of students successfully participating in coursework taught by MCM teachers.

Summary of how the project is innovative: MCM draws its name from the many mathematical connections, whether conceptual, pedagogical, or social, which the professional learning (PL) will instill in teachers, and in turn students, through empowering instructional strategies. The unique and vital contribution of MCM lies in the innovative pedagogical techniques and standards-aligned lessons and resources being developed, which are evidence-based, but not commonly found within the typical classroom. MCM will consist of two main components, (1) standards-aligned lessons and (2) professional learning sessions. MCM is also innovative in that it has a minimum of 18 days of professional learning

included with the curriculum. In this model, the teachers experience the curriculum like the students, receiving and identifying the SEL support they receive in this endeavor, through the structure of the curriculum, the nature of the learning environment, and the support of their fellow teachers.

Other studies related to the proposed project: Since 2017, RCOE and its partners have created and implemented an i3-funded, 12th grade math course and corresponding professional learning titled, i3 Mathematical Reasoning with Connections (MRWC). MRWC was designed to prepare students for the expectations and rigor of college math by engaging students in authentic mathematical practices and creating vibrant mathematical discussions in a supportive environment. MRWC was created to bridge Algebra 2/Integrated Math 3 and College Algebra, PreCalculus, or Trigonometry courses at the postsecondary level. MRWC was not meant to be a preparation for Calculus. Nevertheless, an impact analysis conducted as part of that i3 evaluation indicated that MRWC students significantly outperformed their counterparts in traditional advanced math high school courses (Pre-calculus, Statistics and Probability, and Integrated Math IV), as measured by the Precalculus Concept Assessment. Since the 2017-18 school year, 200 teachers have been trained and implemented the MRWC course in 78 high schools across the Inland Empire in Southern California. MRWC has significantly increased student achievement and attitudes towards math in all years data was collected, compared to control students. The distinction between MRWC and MCM lies in the latter's inclusive approach, catering to all students as opposed to only those who scored a C or better in IM3, the target group for MRWC. This shift in focus is based on data from MRWC students, who were disproportionately labeled as “underperforming,” using 11th grade SBAS scores and 11th grade math course grades, compared to control students enrolled in PreCalculus, AP Statistics, Integrated Math 4, and other 4th year high school math courses. Among MRWC cohorts with previous year SBAS scores available, about 75% were either in Level 1 (Not Meeting) or Level 2 (Nearly Meeting) the standard, while the distribution of control students in the same performance levels in corresponding cohorts was about 65%. These significantly “underperforming” students not only outperformed their counterparts taking other advanced courses, but also grew in engagement and interest in studying after taking the course. As students progressed through the MRWC course, their mathematical identity became more positive as shown in the graphs below and in student quotes. Moreover, MRWC students showed significantly higher interest in attending college.

Proposed implementation sites: MCM will be implemented in at least 100 high school 11th grade mathematics classes across Riverside and San Bernardino Counties in Southern California.

Organizations partnering with this project: San Bernardino County Superintendent of Schools (SBCSS); Cal Baptist University (CBU); various Riverside County and San Bernardino County K-12 districts; and faculty from California State University, San Bernardino; Chaffey Community College and Riverside City