



# Promoting Culturally Responsive Teaching of Mathematical Modeling in Elementary Classrooms

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## Project Overview and Goals

Advancing Equity and Strengthening Teaching with Elementary Mathematical Modeling is a teacher research and PD project focused on strengthening K-5 teaching with mathematics modeling. We bring together equity oriented teaching practices and mathematical modeling to design and research the impact of a blended PD program on teacher practice.

- GOAL 1) develop and refine a model for an innovative practice-based, equity-oriented PD that combines on-line and face-to-face learning spaces for teachers in diverse settings;
- GOAL 2) refine tools and structures to advance equitable participation and develop specific math modeling competencies, and in turn,
- GOAL 3) increase access to and learning of MM for culturally and linguistically diverse children.



Diversifying our Library



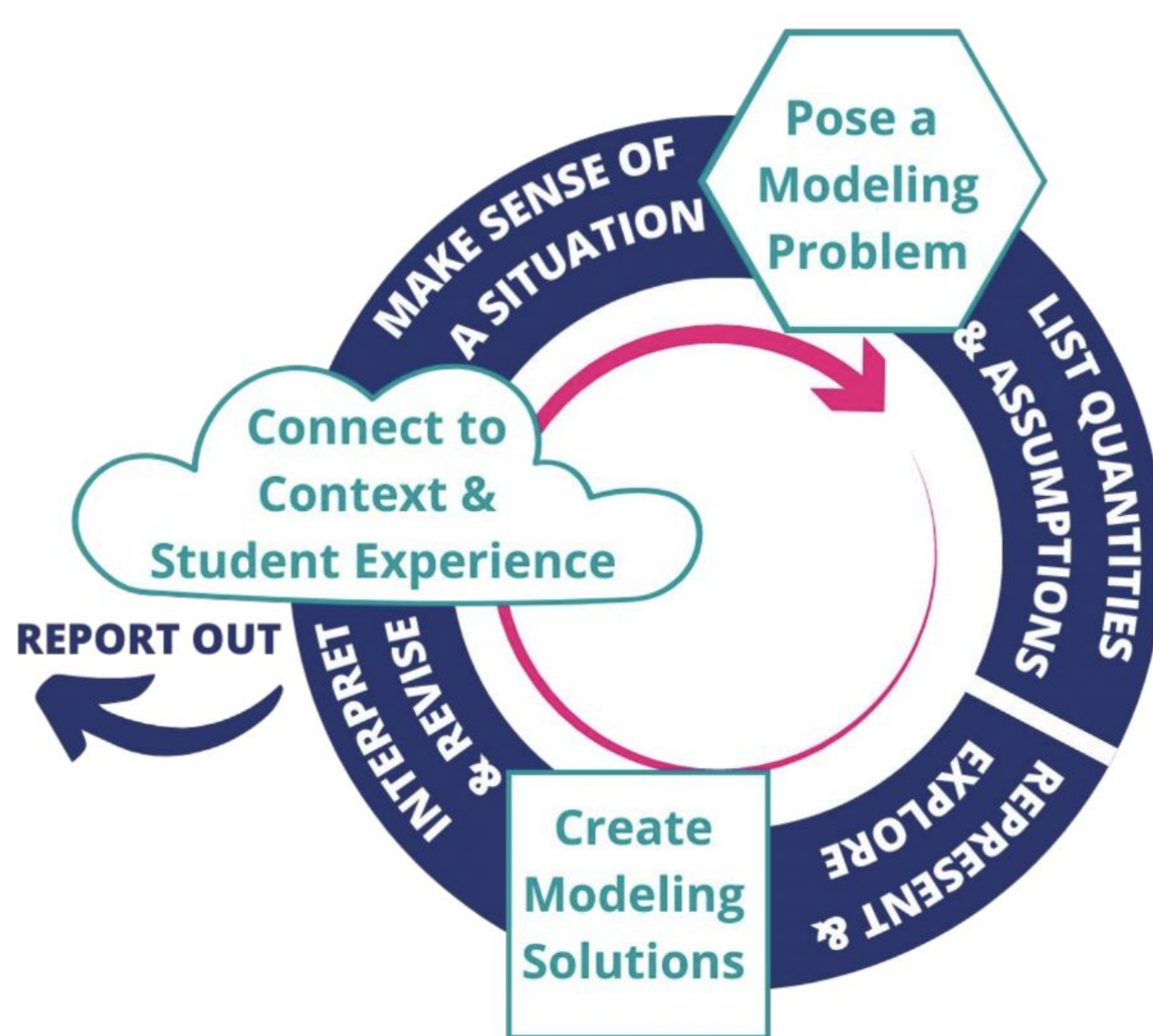
Sports Clinic



Inclusive Playground

## What are the Key Features of Co-designing Culturally Responsive Community-based Math Modeling (CBMM) Tasks with Teachers?

### Math Modeling Cycle



### Culturally Responsive Math Teaching

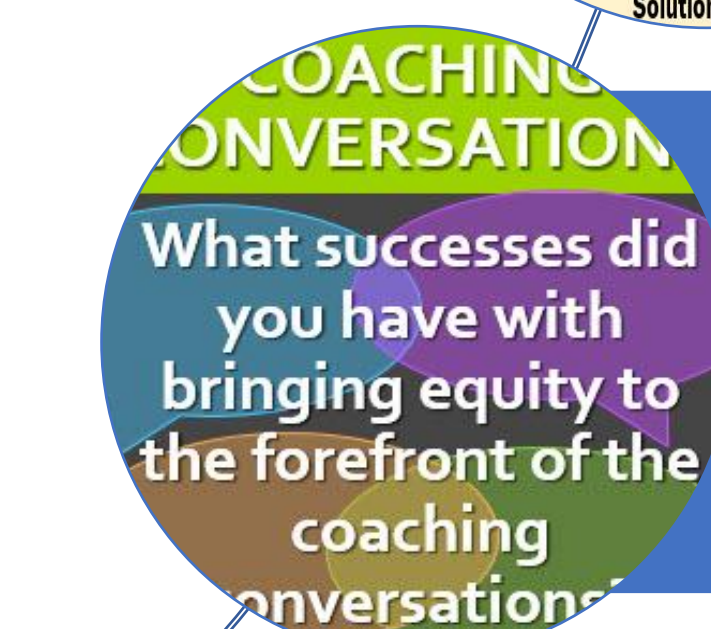
| Knowledges & Identities   | Rigor & Support   | Power & Participation  |
|---|---|--|
| <b>Centering Cultural and Community Funds of Knowledge</b><br>Helping students connect mathematics with relevant/ authentic issues or situations in their lives.                              | <b>Sustaining High Cognitive Demand</b><br>Enable all my students to closely explore and analyze math concept(s), procedure(s), and problem solving/reasoning strategies. | <b>Distributing Intellectual Authority</b><br>Distributing mathematics authority and make space for multiple forms of knowledge and communication.                   |
| <b>(Re) Humanizing Mathematics</b><br>Supporting creativity and broadening what counts as mathematical knowledge, and affirming positive math identities for all students.                    | <b>Scaffolding Up</b><br>Maintaining high rigor with high support for all students.   | <b>Disrupting Status and Power</b><br>Disrupt status differences, entrenched stereotypes, and inequitable power relationships present in all mathematics classrooms. |
| <b>Honoring Student Thinking and Ideas</b><br>Making opportunities to elicit, express, and build on student mathematical thinking in multiple ways (e.g. gestures, pictures, words, symbols). | <b>Affirming Multilingualism</b><br>Making space for multilingual learners (MLL) to be central participants in mathematics activities.                                    | <b>Analyzing and Taking Action</b><br>Supporting student use of mathematics to analyze, critique, and address power relationships and injustice in their lives.      |

**CBMM tasks are situated in authentic local community issues.**

**CBMM tasks explore data to identify & understand social issues**

**CBMM tasks use mathematics to describe, predict, optimize, and make decisions about a situation centering issues of social justice.**

**CBMM tasks yield useful and solution-oriented action for community stakeholders.**



Benefits of collaboratively planning Culturally Responsive Math Modeling lessons with teachers included:

- ownership in a locally situated task that teachers and students cared about;
- allowed for collective and critical analysis, agency and action;
- developed students' and teachers' critical civic empathy and empowered them as change agents.

## How do K-5 teachers understand Culturally Responsive Math Modeling Teaching Practices that Resist Marginalization?

Theme 1: By broadening what counts as relevant knowledge, supporting diverse ways to communicate ideas, and encouraging risk taking, mathematical modeling expands access to challenging mathematics

Theme 2: By redistributing intellectual authority so that diverse groups of students, rather than the teacher, have power and agency, mathematical modeling can disrupt status hierarchies in classrooms.

Theme 3: The openness characterizing mathematical modeling instruction has the potential to further marginalize some students, including emerging bilingual learners and students with different mathematical strengths, unless sufficient instructional supports are in place.

To learn more about our project, visit [www.EQSTEMM.org](http://www.EQSTEMM.org)

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