

# Collaborative Research: Developing a Modeling Orientation to Science Teaching and Learning Variability and Change in Ecosystems

Teams



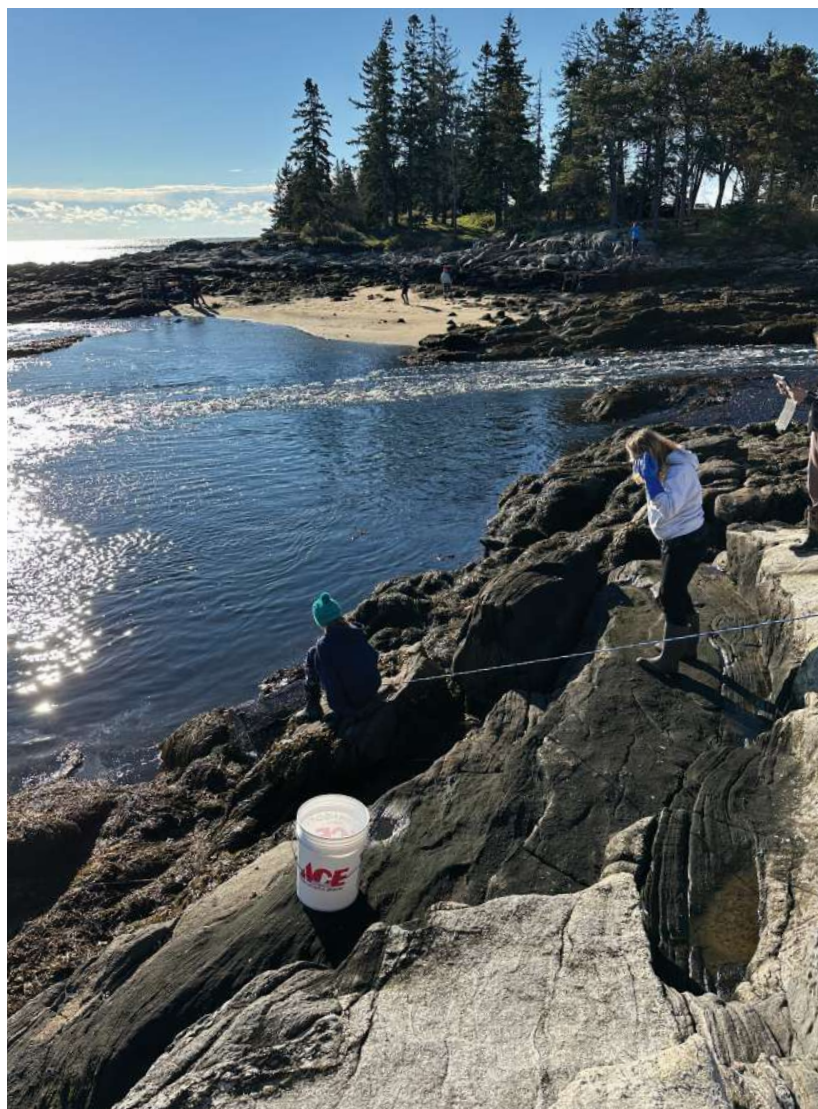
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This project investigated the development of middle-school students' understandings and practices of modeling in the context of investigations of variability and change in ecosystems. The project studied how and to what extent students' participation in distinct forms of modeling informed their classroom-based citizen science investigations. A parallel research effort investigated how and to what extent the development of teachers' comfort and proficiency with the practices of modeling variability changed students' opportunities to participate in these forms of modeling and students' understandings of ecosystems.

## Key Findings

- 1 Through modeling random processes in sampling, students developed conceptual ways to account for uncertainty in sample outcomes and to consider when variability in samples could more aptly be attributed to causes.
- 2 Students advanced their understanding of biotic and abiotic components and relations in target ecosystems.
- 3 Using design-based research methodologies, our project supported shifts in teacher practice by illuminating relations between student thinking, task and context in model-focused inquiry-based learning activities.



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