Supporting undergraduate students’ reasoning about models and modeling in general chemistry

Undergraduate general chemistry courses typically feature a substantial amount of problem solving that involves mathematical and other types of models. Optimally, this type of activity would provide them an entry point into the scientific practice of constructing and using models. But, evidence shows that after participating in traditional approaches to general chemistry instruction, students tend to approach mathematical problem solving algorithmically and may struggle to connect mathematical representations to particulate-level ideas. The question becomes: How can we as instructors support students in more meaningful engagement with mathematical and other models in chemistry contexts? Here, we discuss findings from our research into students’ reasoning about different types of models in the general chemistry sequence and discuss potential routes towards promoting more meaningful engagement in model-based reasoning and mathematical thinking.