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# Leveraging Computational Modeling as a Tool to Understand Cellular Respiration in Introductory Biology and Beyond

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Much attention has been given to the core concepts outlined in Vision and Change (Brownell et al. 2014; Smith et al. 2019). While broad consensus on the value of core competencies, such as systems modeling and simulation, has been reached, integration into undergraduate coursework has proven challenging. Cell Collective (https://cellcollective.org) is a web-based, research grade modeling platform adapted to engage students in creating and simulating dynamic models of biological processes. The use of modeling and simulation emphasizes higher-order cognitive skills, positioning students to be critical and reflective thinkers proficient in problem solving and effective communication (Guy-Gaytán et al. 2019; King et al. 2019). In this workshop, participants will experience, as a student, how to build a model of cellular respiration. That model will then be used to simulate behaviors of the system. Comparing the behavior of the system under varied conditions helps students gain insight into the mechanism of the phenomenon. Participants will gain confidence and experience in computational modeling which can be leveraged in their courses through self-contained, guided exercises. Cell Collective laboratories are suitable for introductory through upper-level classes, and are readily completed in either an in-class or homework setting.

**Keywords**: cellular respiration, modeling

 

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