

Teaching the Modeling Cycle While Investigating the Relationship of Cell Structure and Function

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Models are an essential part of scientific inquiry and science education. But for students to recognize the potentials and limitations of scientific models, the modeling process must be explicitly taught in the science classroom. Through an introduction of modeling in general, a study of physical, geometric, mathematical and computer modeling, and an application of the modeling cycle process in this curriculum unit, students should come to a better understanding of the many uses of modeling in scientific inquiry, as well as a better understanding of the relationship between cell structure and function. This curriculum unit uses activities investigating cells, the cell membrane and diffusion, and the effect of cell size and shape on the ratio of surface area to volume, to explicitly teach how models are used in science and the modeling cycle itself. By the end of the unit, students should be able to connect scientific models with the concepts they are modeling, evaluate existing models and think of ways to improve them, and answer the overarching question: How does cell structure, including the size and shape of cells, relate to its function of moving materials into and out of the cell?