

Integrating Chemistry and Biology: Student Application of Intermolecular Forces in Denaturation of DNA

Anthony Farias*, Kristin Parent, Rebecca Matz, Sonia Underwood

Department of Chemistry & Biochemistry, Florida International University, Miami, Florida, 33199.

Students at the university level tend to segment their knowledge pertaining to the subject at hand and thus have difficulty connecting ideas across multiple disciplines of science. The primary focus of this study is to help students integrate their knowledge throughout these multiple disciplines. Several assessment tasks were developed to convey what we want students to know, how we want them to know it, and how that knowledge integrates across the various subject areas (i.e. three-dimensional learning). These biology assessment tasks were designed to determine how students applied their general chemistry understanding to a larger biological phenomenon. For example, how do students use their chemistry knowledge (strength of interactions between amino acid base pairs) to explain the denaturation of DNA upon heating. Each assessment task has multiple components: presentation of a biological phenomenon, questions relating the biological phenomenon to chemistry ideas, and a reiteration of the biological phenomenon to check their bridging of understanding. The biology assessment was then modified for a biology setting as well as a chemistry setting through an activity. The biology and chemistry activities were both modified to pertain to their subject areas where one activity is held in-class versus out-of-class. Student responses from two different universities within the United States were analyzed using an open-coding process to determine themes in student reasoning. This poster will present the preliminary findings from the assessment tasks and activities.

This work was funded by the National Science Foundation DUE 1708589 and DUE 1708664.