

Developing Biochemistry Concept Inventories for Diagnosing Students' Misconceptions

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Abstract

The Force Concept Inventory presented by Hestenes (*The Physics Teacher*, Vol. 30, pp. 141-158) has been widely adopted and used to reform physics education. However, the field of biochemistry is not yet served by similar assessment instruments, as pointed out by Hal White who emphasized the need for more conceptual questions in biochemistry (*Biochem. Mol. Bio. Ed.*, Vol. 33, pp. 227-8). Our current research focuses on developing biochemistry concept inventories (BCCIs) based on a pilot study in undergraduate biochemistry courses where student responses to the distracters of the pre-assessment questions were mapped to specific known misconceptions. We will present the use of think-aloud protocols to ascertain the validity of the questions. The BCCIs will consist of three thematic sections: (1) structure and function of biomolecules, (2) properties of amino acids and (3) reversible equilibrium. When appropriately used, concept inventories have been shown to have significant effects in reforming undergraduate science education. They provide powerful summative assessments; and perhaps more importantly, they can be formative assessments that aid instructors in adjusting their pedagogical strategies to remediate the misconceptions diagnosed. Thus, development and use of BCCIs should lead to significant improvements in the way biochemical instruction is conducted in the classrooms of the future.