Abstract: Understanding how students learn and process the representations we provide them as instructors is critical to developing classroom and laboratory activities that facilitate student learning. The goal of this research is to determine how students process various types of representations and models in biochemistry in order to identify the cognitive elements associated with them to ultimately develop more effective instructional materials. Using EEG (electroencephalogram) and eye tracking technologies, we measured and recorded the cognitive processing of student participants while they were asked to look at, manipulate, and answer questions about metabolic pathways, serine protease active site physical models, and a virtual PyRX docking activity. Discussion will focus on the difference in processing relative to the amount of biochemistry content knowledge received, differences in processing relative to the students’ spatial ability, and students use of the representation and models to complete the associated tasks. Instructors will be able to take away suggestions in how to think about using these resources in their classrooms.

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