

Abstract Submitted
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Interactive NMR: A Simulation Based Teaching Tool for Fundamentals to Applications with Tangible Analogies¹ SARAH GRIESSE-NASCIMENTO, Boston University, JOSHUA BRIDGER, Dover Sherborn HS, KEITH BROWN, ROBERT WESTERVELT, Harvard University — Interactive computer simulations increase students' understanding of difficult concepts and their ability to explain complex ideas. We created a module of eight interactive programs and accompanying lesson plans for teaching the fundamental concepts of Nuclear Magnetic Resonance (NMR) and Magnetic Resonance Imaging (MRI) that we call interactive NMR (iNMR). We begin with an analogy between nuclear spins and metronomes to start to build intuition about the dynamics of spins in a magnetic field. We continue to explain T1, T2, and pulse sequences with the metronome analogy. The final three programs are used to introduce and explain the Magnetic Resonance Switch, a recent diagnostic technique based on NMR. A modern relevant application is useful to generate interest in the topic and confidence in the students' ability to apply their knowledge. The iNMR module was incorporated into a high school AP physics class. In a preliminary evaluation of implementation, students expressed enthusiasm and demonstrated enhanced understanding of the material relative to the previous year.

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