

Abstract Submitted
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A Research-based Transformation of Junior Electricity and Magnetism¹ STEPHANIE CHASTEEN, STEVEN POLLOCK, PAUL BEALE, University of Colorado at Boulder — Research has informed teaching methods in lower-division courses, helping students master fundamental physics. However, we are still in the early stages of determining the most effective practices for teaching higher-order thinking to a vital group; our physics majors. Aiming to improve student mastery of upper-division material, we have transformed an junior Electricity & Magnetism (E&M) course. Transformations were based on the results of observations, interviews, and analysis of student work, faculty interviews and input, as well as guiding principles of learning theory. I will describe the nature of our reforms – which included consensus learning goals, “clicker” questions, study groups, interactive lecture, and tutorials – as an example of what a transformed upper-division course might look like. I will also present a new conceptual assessment instrument for upper-division E&M, discuss results of that instrument and how it may be used by the physics community.

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