Abstract Submitted
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Research-based active-learning instruction in physics[1] DAVID E. MELTZER, Arizona State University, RONALD K. THORNTON, Tufts University — The development of research-based active-learning instructional methods in physics has significantly altered the landscape of U.S. physics education during the past 20 years. Based on a recent review [D.E. Meltzer and R.K. Thornton, Am. J. Phys. **80**, 478 (2012)], we define these methods as those (1) explicitly based on research in the learning and teaching of physics, (2) that incorporate classroom and/or laboratory activities that require students to express their thinking through speaking, writing, or other actions that go beyond listening and the copying of notes, or execution of prescribed procedures, and (3) that have been tested repeatedly in actual classroom settings and have yielded objective evidence of improved student learning. We describe some key features common to methods in current use. These features focus on (a) recognizing and addressing students' physics ideas, and (b) guiding students to solve problems in realistic physical settings, in novel and diverse contexts, and to justify or explain the reasoning they have used.

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