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Excellence in Physics Education Award: Modeling Theory for Physics Instruction

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All humans create *mental models* to plan and guide their interactions with the physical world. Science has greatly refined and extended this ability by creating and validating formal *scientific models* of physical things and processes. Research in physics education has found that mental models created from everyday experience are largely incompatible with scientific models. This suggests that the fundamental problem in learning and understanding science is coordinating mental models with scientific models. *Modeling Theory* has drawn on resources of cognitive science to work out extensive implications of this suggestion and guide development of an approach to science pedagogy and curriculum design called *Modeling Instruction*. Modeling Instruction has been widely applied to high school physics and, more recently, to chemistry and biology, with noteworthy results.