

**CK02 8:30 a.m. Evolution of Students' Reasoning
Regarding Concepts in Thermal Physics***

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We have been extending our investigation of student learning in thermal physics to the upper-level course targeted primarily at junior and senior physics majors. Through the use of a series of pre-tests, we are surveying students' knowledge of a variety of topics before instruction in order to gauge what they have learned from their introductory courses. We are then monitoring the evolution of students' reasoning as they attempt to unify the macroscopic and microscopic/statistical viewpoints into a coherent understanding of thermal physics concepts. The development of student thinking is characterized by uneven progress, with apparently good gains on certain conceptual themes in parallel with persistent areas of confusion on a variety of fundamental concepts. I will report on initial results of this work, with a focus on students' thinking regarding the first and second laws of thermodynamics.

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