

PST1G-16: 9:15–10 p.m. University Students' Pre-Instruction Knowledge About Temperature and Adiabatic Compression

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This study concentrates on analyzing problems and conflicts that university students faced when asked to define temperature and solve a task about the adiabatic compression of an ideal gas. In the case of adiabatic compression, students were far more likely to incorrectly apply the ideal gas law than to make use of the first law of thermodynamics. They also had difficulties in describing, understanding, and applying basic concepts such as temperature, often using them inconsistently. For example, some students who defined temperature using explanations related to thermal motion later reasoned that collisions between particles cause temperature. Based on these and similar findings in the literature, we suggest that instruction should emphasize the importance of the first law and of differences between adiabatic and isothermal processes. Students' inaccurate micro-level conceptions should also be explicitly taken into account when teaching microscopic models in order to reduce or eliminate common misconceptions.