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Assessment of Undergraduate Physics Students' Misconception about Heat and Temperature and Implications for Instruction

Heat and temperature are fundamental concepts introduced in undergraduate physics thermodynamics with application in mechanics, energy, technology as well as in allied scientific disciplines such as materials science and chemistry. Towards promoting greater understanding of these concepts among students, it is important to identify student misconceptions. In this study, undergraduate physics students' conception of heat and temperature were assessed using the Heat and Temperature Concept Evaluation (HTCE) test instrument developed by Thornton and Sokoloff. The study covered 8 conceptual areas as follows: heat and temperature, rate of cooling, calorimetry, rate of heat transfer, perception of hotness, specific heat capacity, change of phase and thermal conductivity. Study results revealed student difficulties in the conceptual areas of heat and temperature, rate of cooling, rate of heat transfer and specific heat capacity. Interventions to improve student understanding to include experimentation are discussed.

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None

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Primary author: JONATHAN, Enock**Presenter:** JONATHAN, Enock**Session Classification:** Physics for Development, Education and Outreach**Track Classification:** Track E - Physics for Development, Education and Outreach