A two-tier multiple choice questions to diagnose thermodynamic misconception of Thai and Laos students

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The objective of this study was to diagnose misconceptions of Thai and Lao students in thermodynamics by using a two-tier multiple-choice test. Two-tier multiple choice questions consisted of the first tier which is a content-based question and the second tier which is a reasoning-based question. Data of student understanding was collected by using 10 two-tier multiple-choice questions. Thai participants were first-year students (N = 57) taking a fundamental physics course at Chiang Mai University in 2012. Lao participants were Lao high school students in Grade 11 (N = 57) and Grade 12 (N = 83) in Muengnern high school in Xayaboury province of Lao PDR. Each question consists of the first tier question which is a content-based question and the second tier, a reasoning-based question. We found that most students who answered correctly did not choose correct reasons. The results showed that the two-tier multiple choice questions were effective in diagnosing student misconceptions.