



Contribution ID: 210

Type: **Oral presentation**

## Assessing Secondary School Students' Understanding of the First Law of Thermodynamics: Challenges and Insights

*Tuesday 1 July 2025 15:30 (20 minutes)*

To investigate secondary school students' understanding of the First Law of Thermodynamics within the Croatian educational system, we developed a test by adapting the "Survey of Thermodynamic Processes and First and Second Laws (long)". The test was administered to students from three Zagreb secondary schools following their completion of thermodynamics content. Data analysis included the application of the Rasch model, which confirmed the test's functionality and demonstrated that its difficulty appropriately matched the abilities of the participants. Additionally, frequency analysis identified common student conceptual difficulties and areas of difficulty, which will be addressed in the presentation.

### Education level

Age 15-18 (Secondary education)

### Physics topic

Thermodynamics and Energy

### Research focus

Student conceptions / Preconceptions / Misconceptions

### Research method

Analytic Physics Education Research (Quantitative research)

### Organizing preference criteria

Education level

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**Session Classification:** Parallel oral presentations

**Track Classification:** Thermodynamics & Energy (THERMO)