



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 4267

Type: Oral (Non-Student) / Orale (non-étudiant(e))

Case Studies Bringing Real-Life Scenarios into Introductory Physics Curriculum

Monday 27 May 2024 15:15 (15 minutes)

Multiple choice questions are a common valuable teaching and evaluation tool in large-enrolment introductory physics classes across North-American universities. However, they do not provide students with the opportunity to construct and formulate their own ideas. It is desirable to enrich student experience with the activities that reduce the reliance on multiple choice questions, while providing students with the additional opportunities to collaborate on analyzing more open-ended scenarios and, preferably, with some real-life content. Case studies were developed for use in the introductory physics courses for science students. The case studies scenarios target important concepts of the introductory physics curriculum and are focused on common students' misconceptions. The case studies based on a real-life scenario can captivate students' imagination and increase the engagement with the material. The talk will focus on a case study that explores a real-life example of air resistance: a record-setting jump from the stratosphere completed by the Austrian skydiver Felix Baumgartner on October 14, 2012. Baumgartner fell to Earth from an altitude of 39,045 meters, after reaching the elevation in a helium balloon. He managed to break the existing world records for the highest "freefall" as well as the highest manned balloon flight. He also became the first person to break the sound barrier in "freefall", reaching a maximum speed of 1,357.6 km/h while moving through the stratosphere. The video recording and the data from the fall (the elevation and the speed versus time) are available as open-source information. Guided by a series of questions, the students analyze the data set from the event.

Keyword-1

case studies

Keyword-2

introductory physics

Keyword-3

air resistance

Author: Dr ANTIMIROVA, Tetyana (Toronto Metropolitan University (formerly Ryerson University))

Presenter: Dr ANTIMIROVA, Tetyana (Toronto Metropolitan University (formerly Ryerson University))

Session Classification: (DPE) M2-5 - Case Studies, Writing, Literature, and Reasoning in Physics Education | Études de cas, écriture, littérature et raisonnement dans l'enseignement de la physique (DEP)

Track Classification: Technical Sessions / Sessions techniques: Physics Education / Enseignement de la physique (DPE-DEP)