GIREP-EPEC
Transforming physics learning via Research & Practice
LEIDEN, 2025

Contribution ID: **168** Type: **Poster**

School physics experiments with Arduino in lower secondary education

Monday 30 June 2025 16:30 (1 hour)

Based on a master thesis, we present a series of six educational lessons designed for basic school students (grades 6–9) that integrate the Arduino microcontroller into physics experiments. The lessons focus on topics such as electricity, magnetism, and semiconductors incorporating elements of computer science and mathematics. The experiments are designed as hands-on, engaging pupils in practical activities reinforcing theoretical concepts. The lessons include detailed methodologies, lists of required materials, historical notes, time schedules, worksheets, and solutions. The experiments were tested in a real classroom setting as part of the "World in Context" subject at a non-state alternative basic school.

Education level

Age 12-15 (Secondary education)

Physics topic

Interdisciplinary topics

Research focus

Lab experiments

Research method

Practitioner's Inquiry / Action Research (Qualitative research)

Organizing preference criteria

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Session Classification: Poster session

Track Classification: Laboratory-based physics (LAB)