

Supporting primary children's understanding of physics

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New software has significant benefits for primary school children and their understanding of elementary physics, research shows. Studies funded by the Economic and Social Research Council (ESRC) focused on what primary school children know when they begin studying physics, and how much they still have to learn. The studies looked at how much children understand about the movement of objects such as direction and speed.

The studies show that the tasks used in schools to assess how children understand the movement of objects seriously underestimate how much they know already. Professor Christine Howe from the University of Cambridge carried out the research along with Amy Devine, Pepi Savary and Joana Taylor Tavares. The research team developed teaching software to highlight any [discrepancies](#) between different types of [understanding](#). The research also evaluated the effectiveness of this software in promoting performance on school tasks.

"This research suggests there's very little improvement with school tasks between the age of six and 11, and that children aren't being taught in the most effective way. The software we developed would certainly enhance the knowledge that the children already have, and help them perform better in school", states Professor Howe.

Their findings were based on the results of six studies where children were asked to predict outcomes using computer-simulated scenarios. These scenarios included a billiard ball being rolled and striking another

ball to address horizontal motion. Other scenarios involved balls being dropped from hot air balloons to investigate 'how' objects fall.

The key findings include:

- A child's reasoning about horizontal motion and object fall is limited. It also changes little during the [primary school](#) years despite relevant teaching.
- Children using the teaching software made substantial progress in reasoning.
- Children find object fall especially challenging. The understanding of accelerating speed as objects fall through air was virtually non-existent.
- Children may benefit from using the teaching software with a classmate when their understanding is limited.
- Misconceptions about object motion are hard to dispel through existing teaching methods.
- Alternative resources are needed to overcome these misconceptions.

Professor Howe says: "The project has helped bridge the gap between research into 'thought' development and science education research. The software can be used by teachers and children anywhere in the world. The central message of the research is that this free software has significant benefits for primary [school children](#) and their understanding of object motion."

Provided by Economic & Social Research Council

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