

Using cycling to explain why physics isn't a drag

December 10 2015



Credit: Pixabay 2015 CC0

Scientists and teachers have combined to develop a simple spreadsheet-based method of teaching aerodynamic drag to 14 and 15 year olds. By

measuring the speed of one of their classmates riding a bike and taking a photo in order to measure the frontal area of the cyclist, the students were able to calculate the drag co-efficient.

The results are published today, 11th December 2015, in the journal *Physics Education*.

"Usually, describing a realistic motion including [aerodynamic drag](#) would be beyond the scope of a secondary [physics](#) course. However, I realised that this could be done fairly easy for a bike slowing down by aerodynamic drag" explains Florian Theilmann, an author of the paper who is based at the Weingarten University of Education in Germany.

"In a common physics class, physics seems to be presented in a very simplified way." Theilmann continues. "Sure, that helps you to do easier calculations or some experiments but then it is less connected to real life."

The researchers and teachers setup an experiment where a student on a bike was asked to pedal up to a certain point and then call out their speed as they passed markers on the way. The [students](#) also measured the rolling friction of the bike on the surface by pulling the bike along using a dynamometer for 10 meters.

These data were then fed into an excel spreadsheet where the students could vary the aerodynamic drag to match an 'ideal' plot against the plot of their experimental data.

"It might be because it was near the end of the year, or because we were doing something quite different, but the students seemed very engaged with the project." Theilmann adds.

Theilmann is also confident that the computer will change how physics is

taught.

"In the 19th century, it was necessary to understand how to do extremely sophisticated maths in order to do the more sophisticated physics" he explains. "But today, the computer has completely changed this - now problems are much simpler to calculate - so we're able to address much more complex problems and open up new frontiers in science."

Theilmann hopes to work on adapting more real-life physics problems to the classroom, including his current work on simple experiments with his own students such as the rate of flow of water out of a jug or the cooling down of a cup of tea.

More information: Florian Theilmann et al. Exploring the aerodynamic drag of a moving cyclist, *Physics Education* (2016). [DOI: 10.1088/0031-9120/51/1/015001](https://doi.org/10.1088/0031-9120/51/1/015001)

Provided by Institute of Physics

Citation: Using cycling to explain why physics isn't a drag (2015, December 10) retrieved 9 April 2024 from <https://phys.org/news/2015-12-physics-isnt.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--