

# Understanding the chain fountain: A problem-solving partnership (w/ Video)

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(Phys.org) —The Rutherford School Physics Partnership is giving A-level physicists a unique opportunity to tackle a real research problem. The problem of the chain fountain [was revealed by BBC Science presenter Steve Mould](#). 2.8 million people have watched his video demonstration of a chain appearing to defy gravity by first leaping out of a pot before falling to the ground. Professor Mark Warner and Dr John Biggins have published the first formal explanation of the physics behind this puzzle in *Proceedings of the Royal Society A*, as they discovered that Mould's [explanation](#) was wrong..

Alongside this paper, the Rutherford Schools Physics Partnership has published a collection of [problems](#) which take sixth-form scientists from their AS knowledge to an explanation of the research problem. The collection will be available on the RSPP on-line learning platform.

"This is a unique opportunity," explained Professor Warner. "Because physics is such a linear subject, it normally takes years to build up to tackling a research problem like this one."

"The key insight into the chain fountain is that, if you pick a chain up from a table, as well as you pulling the chain into motion the table must also push. Only then can you get a fountain at all. The whole question of the rise relates to fundamentals of momentum conservation along with energy balance. It relates to a wide class of such problems in nature and in technology."

"For the problem of the chain fountain, the Rutherford School Physics Partnership has been able to publish a collection of problems which, when worked through, will take [young people](#) from the simple statics of chains to the model which predicts how high the fountain should rise."

"We hope that by showing how the problems studied at school relate to real academic challenges, young people will develop confidence in their ability to solve physics problems and be inspired to continue studying physics to a higher level."

The Rutherford School Physics Partnership is a project designed to offer support and extension activities in physics problem solving to teachers and students transitioning from GCSE (Y11), through to Sixth Form (Y12 & 13), through to university, by combining an on-line study tool with face-to-face events at partner schools and institutions across the UK.

"We will be looking to exploit the surprises that Steve Mould revealed in a much wider range of problems that we are working on," added Dr Biggins.

"We hope that the young people taking part in the Rutherford Schools Physics Partnership will be working on them alongside us."

Teachers are invited to join Professor Warner and Rutherford Physics Project colleagues for a free annual residential event which in 2014 will run from the 28th – 30th June 2014. To assist with supply cover costs, teachers from state schools may apply for a grant to cover the final Monday of the residential. For further information see [www.rutherford-physics.org.uk/](http://www.rutherford-physics.org.uk/)

For Y12 students there will also be a residential event in Cambridge as part of the Project from the 29th June – 3rd July 2014 and information can be found at [physics.org.uk/](http://physics.org.uk/)"  
target="\_blank">[www.rutherford-physics.org.uk/](http://www.rutherford-physics.org.uk/)

**More information:** Read the open-access paper: Understanding the Chain Fountain, *Proceedings of the Royal Society A*,  
[rspa.royalsocietypublishing.org/.../1098/rspa.2013.0689](http://rspa.royalsocietypublishing.org/.../1098/rspa.2013.0689)

Provided by University of Cambridge

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