Using the Jumping Popper Toy to Teach Forces

Turn the popper inside out, leave it upside down on a surface, and a short while later it will restore itself, “popping” back and jumping over 1m high. Jumping poppers are a cheap, fun and engaging toy with lots of interesting physics.

- Can your classes identify the forces acting on the popper at different times in the flight? (A great opportunity to use the ideas from our SPT Forces resources, such as "Forces Spectacles II: the sequel").
- How high will it jump? Is energy involved? How?
- Does it make any difference what type of surface it’s sitting on?
- How long does it take before the surprise “pop”?

The potential use for these in the classroom has been discussed in the journal *Physics Education* - Exploring 'extreme' physics with an inexpensive plastic toy popper, David R Lapp (2008 vol 43 p 492 - http://iopscience.iop.org/0031-9120/43/5/004) and shown in a video clip entitled ‘The Best of *Physics Education*’ (http://www.youtube.com/watch?v=mIx68kv4QLs). This includes suggestions for mathematical work such as using some simple measurements to calculate the value of ‘*g’*.

You can use a cheap webcam to video the popper and play it back using step mode. This gives a good opportunity to analyse the motion: making it easy to measure the maximum height and show that the velocity of the toy reduces to zero at the top of the curve. Another approach is to use the freeware, Audacity, to record the sound of it popping and then hitting the surface again to measure the time-of-flight.

Further ideas, including where to buy your poppers are discussed on *TalkPhysics*, at www.talkphysics.org/groups/158/forums/3627.

To join this community, go to www.talkphysics.org and click on “register here”.