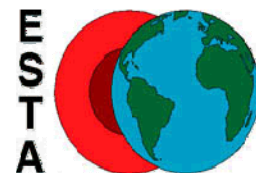




## Viscosity and gas content of magmas – a Coca-cola™ eruption



### **Context & Aim:**

Although explaining the nature of different types of volcanic eruption goes beyond the requirements of KS3, this demonstration aims to give students a real insight into the nature and causes of the violent eruptions that often claim many lives. We have found that, when it works well (beware, getting it to work reliably *does* demand a few dummy runs!), this demo really goes down a storm – it's thoroughly messy (see video clip)!

Background Notes and a video clip can be found in the Teachers' Zone section. These notes also suggest an introductory demo (using a couple of students) to show how much more difficult it is to form gas bubbles in a viscous liquid.

### **Requirements:**

2 bottles of Coke (.500ml). [We've tried other fizzy drinks with less good results!]  
Wallpaper paste  
Freezer (or fridge with icebox)  
Plastic tray.

### **Procedure:**

Cool one cola bottle in the freezer for about an hour (solubility of  $\text{CO}_2$  *increases* as temperature decreases). Pour out top 4-5 cm of cola from the bottle and add 1 tablespoon of wallpaper paste granules/flakes through a paper funnel, then replace the cap immediately and shake for several minutes to ensure that the paste is distributed rather than forming lumps. Allow the bottle to warm up. Also pour a similar amount of coke out of the other bottle (it's best to let it lose a bit of fizz by giving a shake first).

*Note:*

*(i) The exact quantity of paste required depends on the brand used – aim for a reasonably "gloopy" paste, but not too stiff.*

*(ii) Allow the paste a few hours to mix fully and come to room temperature. A good shake of this bottle prior to carrying out the demo will help!*

This works well as a co-operative demo with two students: each is instructed to give their bottle a gentle shake, place it in a plastic tray, hold it firmly and open it rapidly, ensuring the top is removed completely. The one who opens the standard Coke bottle sees some fizzing and perhaps a little frothing as  $\text{CO}_2$  escapes. With luck, the second bottle of "high-viscosity" cola will, after a moment, start erupting a mousse of sticky froth (especially if given a really good shake just before bringing in and giving it to the student!).

### **Follow-up:**

Students can research historic eruptions such as Pompeii AD 79, Martinique 1902, St. Helens 1980, or find out more about pumice and pyroclastic flows, or even research the nature of "super-eruptions" and the formation of volcanic calderas. There being lots of information and pictures on the web, there are many possibilities for wall displays.