

Activity: Pop-top Bottle Rocket

On SCOPE's Science 101 episode, you saw Julia use launch a bottle. Here's how she did it:



What you need

Vinegar
Bi-carb
Pop-top Bottle (600ml works well, but smaller ones are ok)
Rubber Glove
Plastic cup
Paper slide/funnel

What to do

1. Pour some vinegar into the rubber glove, enough to fill a couple of fingers.
 2. Add in about one spoonful of bicarb and quickly tie up the open end.
 3. What happens?
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1. Pour some vinegar into the bottle, about one third full.
 2. Quickly add a heaped spoon of bicarb (using a paper slide or funnel if that helps) and screw the lid on tightly to keep the pressure in.
 3. Turn the bottle upside down and place it in the cup so it is held pointing upwards.
 4. Watch and wait.

What's happening?

Ahh...Vinegar and Bicarb... The two staple ingredients every young scientist must have. For the regular watches, you may have seen them used to make a volcano (<http://www.csiro.au/scope/activities/e27c02activity.htm>), a jet powered boat (<http://www.csiro.au/scope/activities/e128c01activity.htm>) and even a fire extinguisher (<http://www.csiro.au/scope/activities/e135c01activity.htm>).

All of these work because vinegar is actually made up of acetic acid mixed with lots of water, and bicarb (also known as baking soda or sodium bicarbonate) react. When they mix, there this is an acid-base reaction. Vinegar, which is an acid, reacts with the bicarb, which is a base. The bicarb breaks down and carbon dioxide is released- the same stuff that we breathe out. That is where all the bubbles come from. You can see just how much gas from the size of the rubber glove in the experiment. But why?

Well, one molecule of the acid, reacts with one molecule of the bi-carb to make one molecule of gas. But gases take up wayyyy more space than solids or liquids, which is something we will put to good use when making our rocket

The gas build up pressure inside the bottle until it pops the top (which is now underneath). Vinegar is thrust out of the bottle, and this forces the bottle to fly upwards. But how much vinegar and how much bi carb are ideal? Well the only way to find out is to experiment.