

Team First



Patrick Watson

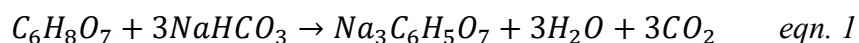
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## Background

For the Team First assignment, we decided to image the interaction of sodium bicarbonate and citric acid in water. The reaction creates sodium citrate, carbon dioxide, and excess water. The full reaction is shown in equation 1. This reaction is what gives bath bombs their novelty of fizziness and helps to mix and diffuse any additional additives in the bath bomb for the user.



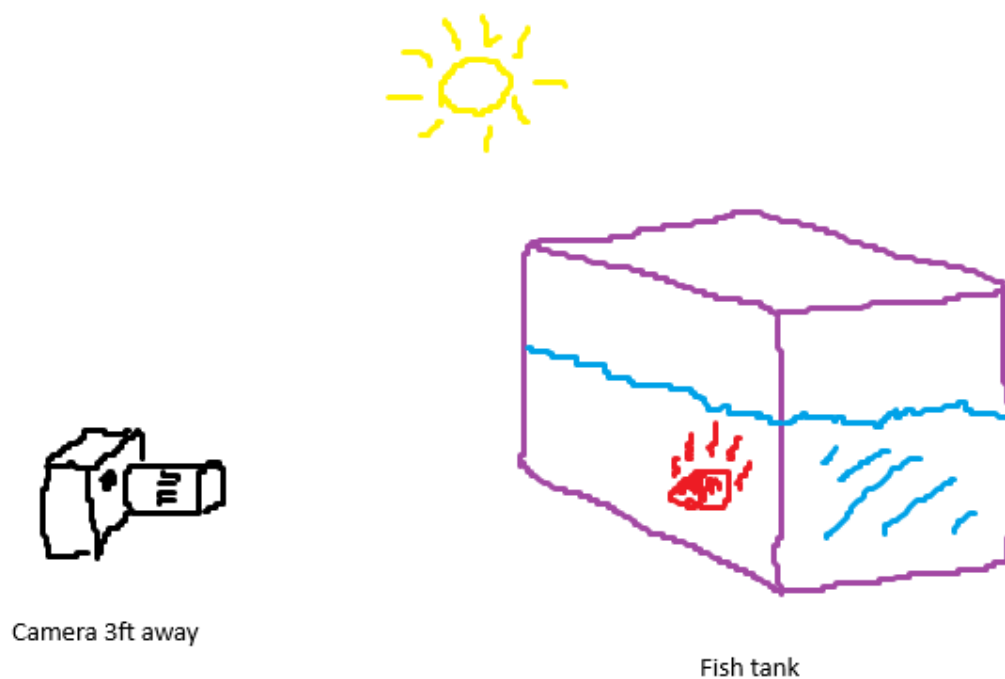
## Procedure

We started by borrowing a 20 gallon fish tank from Professor Hertzberg. We then filled the fish tank to roughly half (approx. 10 gallons) in the ITLL basement. We decided the lighting in the basement was not good enough for our experiment, so we conducted the experiment outside on the South side of the ITLL. We then procured a large piece of butcher paper to cover the back side of the fish tank and help diffuse the sunlight. We spent around 10 minutes preparing and framing our images and then we carefully dropped the sodium bicarbonate citric acid ball into the water filled fish tank. Immediately the ball started fizzling off carbon dioxide and changing the color of the water. Throughout the reaction we took photos of the ball to monitor its progress. As time progressed, we noticed that the ball gained porosity that also increased the interaction with the water to be more vigorous. The total time for the ball to dissolve was roughly 15 minutes. After about 6~7 minutes the reaction slowed due to a reduction of surface area for the water to interact with. The ball looked like a choral reef after the first 10 minutes.

## Camera Setup

To shoot this photo I used my Nikon D7500 with a Nikkor 18-55mm 1:3.5-5.6g lens. Before dropping the sodium bicarbonate citric acid ball into the water I focused the camera on roughly the middle of the fish tank from around 3 feet away with the lens zoomed just enough to

have the free surface and bottom in view. The ISO was 1250. The aperture size was f/11. The shutter speed was 1/500s.



*Imaging Setup of the Reaction*



*Unedited Photo (Left) vs Unedited (Right)*

When editing the photo for release, I decided that the most important aspect was to increase the color vibrance. Using Photoshop's Curves adjuster, I was able to boost the range to give it more red/pink vibrance. I also cropped the photo along the sides and mostly kept the height unaltered.

I think the photo turned out very well. I want to play with the colors in Photoshop and maybe make it black and white altogether. The photo shows off the CO<sub>2</sub> bubbles very well. The only downside is that I wish the lighting was better. Since the photos were taken in the evening (5:30pm) we were racing the sunlight and I wish we took the photos around noon with the sun directly overhead. I feel with the sunlight coming straight down on the tank would help boost the details in the photo and the porosity would be much more evident.

## Sources

*The Chemistry of Bath Bombs.* www.ChemistryIsLife.com. (n.d.).  
<https://www.chemistryislife.com/t-9>