

Team First/IV 2

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With help from Will Dietz, Meredith Stading, and Ryan Wells

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1: Introduction

This video was created for the first team assignment. I worked in collaboration with Will Dietz, Meredith Stading, and Ryan Wells to create oobleck, a non-Newtonian fluid, and captured the curiosities of it with a high speed camera. In the video that I made, I dyed my oobleck, which is made of cornstarch and water, a light yellow, and flung it at a 10 inch by 15 inch pyrex casserole dish from above. Will, Maridith, and Ryan helped me run the camera while I flung the oobleck down onto the pyrex. My final edited video is three different takes edited into one video. It was crucial to capture multiple takes because the oobleck never reacted the same twice.

2: Set Up and Relevant Physics

The flow that is being captured here is a non-Newtonian fluid. Like mentioned above, oobleck is a mixture of cornstarch and water. This mixture changes its behavior when it is under stress or strain. The sudden stress, like hitting a glass plate, causes the oobleck to get thicker and act like a solid. Once it settles, it returns to its earlier state and becomes a runnier liquid.

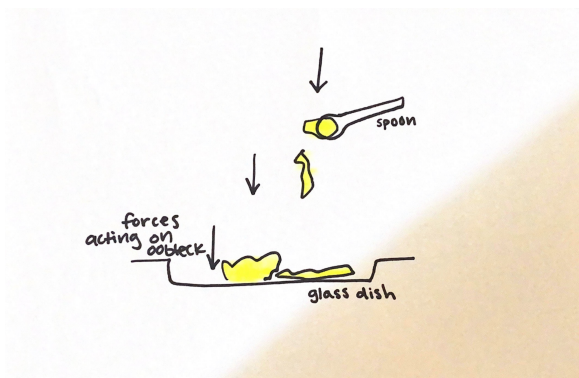


Figure 1: Sketch

3: Visualization Techniques

This experiment was done inside, on a table top, and used a pyrex baking dish that is 10 inches by 15 inches. To make the oobleck, I used one cup of cornstarch and half a cup of water, along with yellow food coloring. I added cornstarch as needed to thicken the mixture up, or added water to make it thinner. I used a metal spoon to scoop the oobleck and throw it straight down onto the glass dish from about a foot above. For the lighting set up, a 3-point LED Ikan light kit was used, with the color temperature set to 5600K for a cool-colored atmosphere. One light, the key, was set to 100% intensity. The second, a fill, was used at 50% intensity, and a kicker (back light), was used with 20% intensity. A white sheet was used as a backdrop and table cloth. See image below for set up; where the jar is in the photo was where the pyrex dish was placed.



Figure 2: Set Up

4: Photographic Technique and Choices

Shot on a Sony RX10, the glass dish that was photographed was about 8 inches away from the lens. The field of view was about 6 inches x 6 inches. The zoom lens that used to capture the final image was zoomed all the way into 70mm. The frame rate was set to 600

frames per second. For editing, all that was done was adjustments in saturation and highlights, to make the oobleck pop more against the white backdrop, in addition to slight cropping. Three different takes were edited together to create the final video, and the music that I used is *Wicked Man* by Martin Landstrom. The link to my final video is below.

<https://youtu.be/TUMaxAoVDvc>

5: Further Work

I think that this video highlighted the different ways that oobleck interacts with its environment in a great way. It would have been interesting to do more oobleck, a wider field of view, or maybe more/different colors. While I do have somewhat of a grasp on non-Newtonian fluids, but I would like to understand the physics behind what is happening better. I tackled this in more of a visual sense because of my background, but I think that the fluid physics that are happening are shown in an artistic way. Overall, I think that this video turned out pretty well.

6: Sources

Non-Newtonian fluids. (2010, April 12). Science Learning Labs Pokapu Akoranga Putaiao. Retrieved October 10, 2022, from <https://www.sciencelearn.org.nz/resources/1502-non-newtonian-fluids>