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Group 8

## Group Second Report

For this project we decided to try and use the high speed camera to capture the popping of a balloon. The initial setup of the camera was difficult as checking the focus of the video was hard on the little screen. We were also moving the balloons quite a bit when trying to puncture them so the focus seemed to change throughout the video. As for the physical setup, Greg was holding a balloon that was filled with dyed water, and then punctured it with a knife. We needed to create an 'X' on a board of wood so that we didn't need to try and position the camera after each attempt. Duncan was working the camera and took all of the shots. Brent and I cleaned up after each shot and helped with positioning the shots, as well as looking at the live video on the computer to help refocus. During the exporting process, the videos were far too large to deal with so we had to compress them via the software, and then send them out to everybody. This caused a huge drop in quality of the image. It didn't help that we shot at 256x256 so it was already fairly low quality. We dropped to this resolution so that we could slow down the video even further to see the initial motion of the water after the balloon was popped.

We can see a few things happening during the popping of this balloon. When the balloon is punctured, you can see it return to its initial position (before it's filled up with water). This is due to the balloon being in a constant state of tension as the water expands the material. When the material is pulling away, it's dragging some of the water with it due to friction, which actually causes some of water to spray out of the sides. We can also notice that the balloon flings off to the right, which is due to the balloon material pushing off of the water. This normal force on the water actually causes it to move off to the left. Lastly, most of the water towards the middle hasn't been affected by the balloon, and when the balloon is initially popped, the water doesn't move because the force of gravity was being countered by the force of the balloon (and other water below it) pushing it upwards. When these forces cancel, the velocity remains zero. However, a split second after the balloon is no longer there, the acceleration due to gravity hasn't affected the water enough, so it remains at zero (or near zero) velocity.

There wasn't a whole lot of post processing done for this video because I had a hard time figuring out how to work with the program (DaVinci Resolve). I initially tried to invert the colors, or simply change the colors a little, but due to the fact that we lost a lot of data some of the pixels were messed up, so the color transition didn't work very well.