

The purpose of this photo was to show flow of liquids with different densities. To set up, we put water in a large beaker. Oil mixed with food dye was forced into the water to show the different liquids reacting. Many different colors of food dye were experienced with, but red showed a feeling of blood going through a vessel. We used a plastic cylindrical squeeze bottle that allowed for enough force to push the oil to the bottom of the beaker holding the water. Our plan was to show how the different liquids mixed. This was only possible due to the help from Eric Robinon, Luke Collier, Phil Nystrom, and Yousef Shashtari. They provided the materials needed for the set up and cameras to capture the photos we all took. Below you can see the original photo taken and further down you can see the final image after editing.



Water was sitting still when oil mixed with red food coloring was poured into the water. This allowed for the mixture to show distinct different fluids mixing together. Using a cylindrical bottle with a flow of oil out of the tip at about a diameter of 1 cm. It was poured at around 1 m/s to ensure it would reach the bottom of the beaker. The viscosity of oil is $2.05 \times 10^{-6} \text{ m}^2/\text{s}$. This puts the Reynolds number at 485. The flow is laminar through the mixing liquids. This is apparent because the liquids look smooth and not mixing well.

Red food dye was incorporated in the olive oil used to push in the standing water. This gives the desired effect of blood in a noticeable liquid. Water was sitting inside of a beaker where the oil was forced into. Behind the beaker was a piece of black cardboard to help with the coloring. The lighting was all natural from the lights above and no flash on the camera. The camera was focused in on the fluids.

The camera used was Phil's and it was a Nikon. This allowed for very clear images. He had a tripod that made sure everything was stable and did not move when trying to capture the best image. The total field of view was around a foot by a foot. I later cropped the image down to about half of that size. The camera was set up about 4 feet from the focused image.

I am happy with the outcome of this image. The final product was what I was looking for. The different liquids not quite mixing and allowing for distinct fluid flow. I enjoy looking at the oil hitting the bottom of the glass and bouncing back up. It makes for a fun image of trying to understand which direction the oil is moving. It was also nice to see the water completely turned into black so it makes the red dye stand out much more. Below you can see the final image.

