Team Third Video

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For the third team image my team and I utilized waterproofing materials to induce phenomenon in different liquids. I used Sno-Seal, a bees wax based waterproofing agent, to coat a piece of standard printer paper. I wanted to depict the different ways that water acts when it is dropped on the same piece of paper but on different surface treatments.

To set up the experiment I used a sheet of printer paper, a pencil, red food coloring, Sno-Seal, tape, a galaxy s6 phone, and a table placed outside in the sun. I used the pencil to draw a box on the paper to indicate where I was going to apply the Sno-Seal. I then applied the product as instructed on the Sno-Seal website (1). I then taped the paper down to a table that was in full sunlight. I used the Galaxy s6 phone because after repeated attempts it was evident that the other camera I had would not perform as desired. I set up the phone on the table and focused on a chopstick that I placed in the area intended for the drop to impact on. The subject was about 4.5 inches away from the lens of the camera. I then removed the chop stick and started the camera. I dropped a single drop of red food coloring onto the impact zone. I then repeated the process with the untreated section of the paper. The result is a depiction of water beading up on the treated surface while on the untreated surface it remains spread out and is absorbed by the paper.

The food coloring was water based so for this experiment we will assume that the dye acted exactly like water does. Water is a polar molecule. When the two hydrogen atoms combine with the oxygen atom there is a resulting positive and negative side of the molecule. The covalent bonds that form the water molecule are the cause of the charge. The shared electrons tend to remain closer to the oxygen molecule thus making the oxygen side slightly negatively charged and the hydrogen side positively charged as shown below in figure 1.

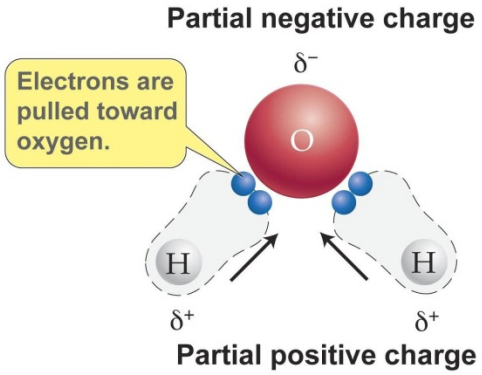

Figure 1 Charged Water Molecule[1]

The Sno-Seal is non polar and thus the water does not attach to it. Instead once kinetic energy of the falling drop is dissipated the drop retracts into a dome on the surface of the paper. This is caused by the electromagnetic charges mentioned above. The water molecules are attracted to themselves and stick together. This reaction is much like when water beads up on a freshly waxed car or any other water repellant surface. When the drop landed on the untreated paper it spread out and remained there. Once the dye is forced out by the transfer of energy from the drop to the paper it begins to seep into the paper and thus holds its circular shape and does not bead up like it did on the treated paper.

The image was taken with a Galaxy S6. The two videos had a frame rate of 120 frames a second and was edited in Imove. The original frames were shot in 1080x720 pixels. The final video has a frame rate of 29 frames a second and a combined size of 1280 x 720. In post processing I first cropped the video to just the two drops and then slowed down the speed to 5% the actual speed. I then cut the clips so just the drops were in the video and synced the videos together. Finally I use black and white setting with a red filter to help the drops stand out better against the background.

1 "Sno-Seal Application Tips and Instructions." Sno-Seal Application Tips and Instructions. Sno-Seal, n.d. Web. 10 Dec. 2015. <http://www.atsko.com/sno-seal-application-tips-and-instructions/>.

2"Why Are Metallic Compounds Insoluble in Water? Chemistry Ionic Bonds Metallic Compounds." Socratic.org. N.p., 26 Mar. 2015. Web. 10 Dec. 2015. <http%3A%2F%2Fsocratic.org%2Fquestions%2Fwhy-are-metallic-compounds-insoluble-in-water-1>.