

Skittles Diffusion

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Team Third

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Figure 1: Screenshot of skittles diffusing in water

Team #07: Ross Cooper, Dylan Crane, Anna Lynton

Background

For the Team Third project, our team wanted to capture images involving the diffusion of skittles in water. My goal for this project was to capture the flow phenomenon with a time-lapse video. The experiment took place in the ITLL outside the classroom. Working with Ross Cooper, Dylan Crane, and Anna Lynton was a great opportunity because everyone was excited for the project and had good ideas.

Capture Setup



Figure 2: Capture setup

Figure 2 shows the setup used to capture the image. The camera was mounted directly above the plate using tape to create a stable structure. Only ambient light from light sources within the building were used.

Flow Physics

The flow phenomenon that was captured was the diffusion of skittles in water along with water stratification. The coating on the skittles dissolves in the water and this mixture, at a high concentration near the skittles, spreads to lower concentrations at the middle of the plate. The water only flows inward because there is no water on the outside of the ring of skittles to promote diffusion. As seen in the video, the colors do not mix until the skittles coating is fully spread throughout the water because of the phenomenon of water stratification. The different colors create mixtures with slightly

different properties, generating a barrier effect where the colors meet ^[1]. Therefore, color bands form as the mixture spreads. An example of water stratification in nature is fact that fresh water and salt water not mixing. Although this video is a time-lapse, the whole process took place in less than three minutes.

Visualization Technique

Once was the camera was set, we position the skittles on the plate and the plate under the camera. We then poured water on the plate, creating a layer of water that was almost as tall as the skittles. The skittles were arranged in the way shown for an artistic effect. Since there were different numbers of each color, we just created a circular pattern, which turned out to be a beautiful technique due to the water stratification. We chose a completely white background to focus all of the attention on the flow.

Photographic Technique

We used a Nikon D610 DSLR camera with a Tamron AF 28-300 mm lens. The lens was about 1 foot away from the plate when the picture was taken. The only post-processing I preformed on the video was adding the titles and slowing it down by 50% for the second part of the video. I added a royalty-free song by Bensound to enhance the aesthetics.

Results

I really like the color bands in the video. The white background makes all of the colors pop. The slight bending in all of the color bands is another interesting feature. I fulfilled my intent by taking a solid time lapse video and I am happy the results. To improve this work in the future, I would try to control the glare from the camera better.

References

[1] How to STEM. (2017). Skittles Science. Retrieved December 12, 2018, from <http://howtostem.co.uk/wp-content/uploads/2017/03/Skittle-Science.pdf>