

Get Wet Project

For the first assignment my intent was to capture a water drop impacting a still body of water and creating a rippling effect. My goal was to capture the exact moment the droplet hit the still surface to see how both the droplet and body of still water act during this event. The image I was able to capture demonstrates how the water shoots upward post impact called a Worthington jet as well as a satellite drop that disconnects from the jet.

The set up for the photograph was simple and can be repeated using common household items. The set up for the photograph can be seen below in Figure 1.

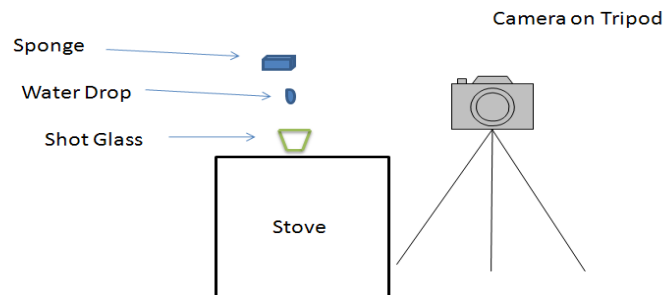


Figure 1. Photograph Set Up

A green shot glass was placed on a stove top and filled to the rim with regular tap water. The lighting was created from the incandescent light bulbs in the kitchen, the lights from the oven hood, and a desk lamp. The background for the photo was black construction paper. To create the water droplets I wet a sponge and slowly squeezed it for droplets to start falling. The shot glass had a rim diameter of about 50 cm and was positioned about 20 cm from the camera. The camera was set up a few inches above the rim of the glass in order to capture the ripples if they would appear in such a small surface area. The column of water (jet) in the image is approximately 20cm tall and the satellite drop forms at the maximum height of the column.

The flow of this fluid involved a drop falling under gravity and impacting still water that was contained in a shot glass. Gravity is the only body force present in this setup. The column of water and satellite drop are part of a phenomenon studied by A.M. Worthington in the 1890's. He was the first person to study and document the different stages of a drop impacting still water from impact, to crowning, to jet formation, to ripple. The photograph I was able to capture demonstrates the Worthington jet as well as the

satellite droplet that breaks off when the jet reaches its maximum height. The column or jet of water is created when the crater that is initially formed collapses inward and the water tries to fill that space and return to equilibrium by filling that empty space with water. The crater is filled so rapidly that the water is thrust upward causing it to rise above the surface. The top of the jet is moving fastest and has enough energy to create a drop that separates from the column when the jet reaches its maximum height. In the image I was able to create you can see the beginning formation of a second satellite drop that will separate from the jet.

The lighting of the photographic setup was crucial to capturing the image in focus and detail. Besides the lighting that was available from the ceiling I used a desk lamp approximately a foot away from the glass to illuminate the space. I also used the flash on my camera to freeze the image and make it appear as it is not moving. A large amount of light is needed in order to use a lower ISO setting reducing noise and a fast shutter speed to freeze the image in time.

Photographic Technique:

The image was taken with the camera approximately 20 cm from the shot glass and a few inches above the surface of the water.

Size of Field of View: 2-4 inches

Lighting: Incandescent ceiling light and desk lamp (1 foot away from glass)

Distance: 20 cm from camera to glass

Camera: Canon Powershot SX110is 9Megapixels

a. Manual Focus ~20 cm

b. Flash Fired Low Output

c. Continuous Shooting

d. ISO 400, Aperture f3.5, Shutter Speed 1/500, Tungsten White Balance

e. Image size: 3456 x 2592 pixels

* Photoshop curves used to offset color of shot glass and change color of reflections of the light bulbs in the room.

I really like the focus and clarity of the image and its intent was fully realized. The image shows the shape of Worthington jet and the satellite drops that is created from the jet. What I would have liked to see from this image that I was not able to capture are the ripples that are created from the impact. This can be done by using a larger surface area for the still water. In order to develop this idea even further the scale of this set up can be increased where the droplets are larger on the scale of golf balls. This would create larger satellite drops and a larger Worthington jet.

References

History of Splash Photography

<http://courses.ncssm.edu/hsi/splashes/history.htm>