

Abstract Submitted
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The Study of a Liquid Droplet Falling Through Two Immiscible Layers of Liquids BIANCA MESA¹, Florida Atlantic University — In an exploratory experiment, we noticed the unusual behaviors of liquid droplets falling through layers of oil and water. A rectangular container was filled with an aqueous solution and a layer of oil. A dropper was used to control the size of the droplet. Water was mixed with Bromothymol Blue dye, a chemical indicator, to visualize the flow processes. Surface tension and the buoyancy of the oil layer between the liquid droplet and the water below caused the liquid droplet to be stopped at the interface. Over time, the support weakened and the droplet would fall quickly through the water. The first of two cases was a salt water solution with NaOH, and the second consisted of balsamic vinegar and NaOH. Once the salt water droplet touched the aqueous solution, it collapsed, sank and spread rapidly at the interface. The sinking motion dragged the spreading fluid back to its center and then down. For the second case, a trace amount of the droplet spread rapidly at the interface while the main portion of the droplet sank and then spontaneously exploded. The difference in behavior is mainly due to the surface tension of the droplet in water. The underlying mechanisms of the droplet's flow instability are from the effects of diffusion weakening the surface tension.

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