Conclusion

Our original hypothesis was originally designed to test three different experiments in microgravity: silicon fluid capillarity in a tapered tube, in a tube with a constriction, and splitting an isolated droplet once it has left a tube. Our actual experiments differed from these original plans. Ending up with more drop time than we had planned for, we were able to test a multitude of experiments, consisting of tapered tube capillarity, hourglass shape constrictions, launching droplets of fluid between tubes, and tubes with slits and holes. We never tried to split a droplet that had already exited a tube.

The basic purpose of our experiment, however, remained the same: to test the characteristics and properties of a more consistent liquid (silicon fluid) in various micro-gravity situations.

Our results were mostly in favor of our expectations as far as capillary action was concerned: the fluid in the tapered tubes rose faster than in the straight tubes, and even quicker in the constricted, hourglass shaped tubes. We hypothesized that in an hourglass shape that the fluid would perhaps make a droplet inside the tube, and although you can see it shoot up the side of the tubes after the constriction, the fluid remained in contact with the walls. We were even able to get an isolated droplet to be launched through a gap between one tube and another. Some of our other hypotheses concerned making bubbles within the tubes and raising the liquid past the slits in the side of the tubes. We were able on several accounts to see a bubble being formed within the tubes during the drops. In some of the drops, the tube's opening at the top was so large the liquid was not able to get enough upwards velocity to separate from the tube at the opening. Rather the liquid would sort of blob up out of the tube in a thick stream while staying connected to the liquid still inside the tube, and then would begin to climb back down toward the tube before hitting the air bag at the bottom because of its adhesion with the outside of the tube. Watching the video, we could see the point at which the upward momentum of the rising fluid was arrested by adhesion and surface tension, and the entire thing started to come back down. At this point, the fluid would overcome the right angle geometry of the top of the tube and climb down the outside.

Our hypotheses were mostly correct: we succeeded in making isolated droplets and found that the liquid moved faster through the constrictions of an hourglass tube. We also did not expect the liquid to remain in a connected blob, and then climb down in the tubes with larger openings. In conclusion, the tests agreed with most of our hypotheses and ideas of capillarity, despite the few unexpected results.

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