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Rocketry: Does Size Matter?

This year, I wanted to find out if the size of a rocket would change how efficient cargo is carried into space. To experiment, I used a 2 1/2" and a 1" body tube. I had the 2 1/2" rocket already built, so I figured the volume of it and then made the other 2 rockets the same volume. The rockets each had a volume of 39.19 and weighed 102 grams. The 2 1/2" rocket was 8" long, 1 1/2" rocket was 22.27" long and the 1" rocket was 49.61" long. After I built each rocket, I launched them. I picked a calm, sunny day, so the launches would be the same. I used C6-5 engines in all the rockets. When they were launched, my rockets were tracked for height and timed for take-off to engine burn out. We launched all 3 rockets twice. We then took the data, did some math and came up with the meters/second each launch achieved. My results showed that the 1 1/2" medium sized rocket actually was efficient having the best meters/second launch. The long skinny 1" rocket that I thought should have been the best proved to be affected by increased drag on its boundary layers because of its length. The viscosity in the air can affect these model rockets as well as an actual NASA rocket. Long and skinny isn't always the best.