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Rocket Design: How Changing Rocket Features Affects the Height of a Rocket's Flight?

The purpose of my project was to determine what aerodynamic features would improve a model rocket's flight or what features would make a rocket's performance worse. My question was: how does the design of a model rocket affect how high it flies? I researched rocket aerodynamics and design and made hypotheses about how specific model rocket designs affect performance. I found out how to make an inclinometer to measure the rocket's height. I built two inclinometers, control rockets, and rockets with 4 different modifications: added weight, added fins, unevenly spaced fins, and an unstreamlined body. I launched the rockets, measured the angle of the peak height of each rocket using the inclinometers, and recorded the data. Then, I calculated the height of each rocket's flight. Only one test confirmed my hypothesis: the rocket with the added weight. The other rockets did not confirm my hypotheses: unevenly spaced fins did not affect performance, the unstreamlined rocket went higher than the control rocket, and the rocket with the added fins went out of control. These findings and additional research led me to believe that the fin spacing does not necessarily affect performance. The tape flaps that I used on the unstreamlined body might have acted as vortex generators to add lift. And, the added fins caused the center of pressure (lift) to be above the center of gravity, which makes the rocket unstable.