



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

<b>Name(s)</b> <b>Ethan Kwan</b>	<b>Project Number</b> <b>J2018</b>
<b>Project Title</b> <b>Now That's a Lot of Damage! Which Premium Tape Has the Greatest Tensile Strength?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> There are a lot of premium tapes out there. There is 3M Duct Tape, Flex Tape, Gorilla Tape and so much more. But which one is strong enough to fix your everyday problems? My hypothesis was that Flex Tape would be the strongest premium tape. The goal of my experiment was to determine which premium tape has the highest tensile strength.</p> <p><b>Methods</b> The materials I used in my experiment included weights (130 pounds), 6 different types of premium tape, a pulley system (Universal weight set), ruler, scissors, and a stopwatch. I conducted my experiment at my local fire station because it had a Universal weight set, which for my experiment functioned as a pulley system. The first step of the experiment was to test each premium tape using the same width and length of tape to remove any variables involving the size of the tape. I used 2 inches wide by 8 inches long pieces of tape. Next, I attached one end of the tape to a hook which was attached to the pulley system and I attached the other end of the tape to the weight set bar or hand pull. Lastly, I pulled down on the weight to create tension for 10 seconds using a stopwatch to keep track of the time. I started my experiment with 5-pound weights and increased the weight by 5 pounds until the tape broke.</p> <p><b>Results</b> During all three cycles of my test my results where exactly the same. This showed that the tapes perform consistently. Since the weight set I used was a Universal weight set I believe I provided consistent tension to help determine the tensile strength of each tape. In my experiment the common trend was that most of the tape stretched and most of them failed at or below 100 pounds. The only tapes that were able to resist tension over 100 pounds were the 10X Fiber Fix and the Gorilla Tape.</p> <p><b>Conclusions</b> After completing my experiment, my data did not support my hypothesis. After testing the tensile strength of each tape three separate times, the results were clear. Flex Tape was not the strongest premium tape. The most remarkable tape was 10X Fiber Fix. 10X Fiber Fix barely stretched and did not break at 130 pounds, which was the maximum weight I had during the experiment.</p> <p>The implications of my results help the consumer select a premium tape that will help them fix everyday objects. By extending the life of objects can also preserve the environment by reducing waste.</p>	
<b>Summary Statement</b> In completing my experiment, I was able to determine which of the premium tapes I tested had the highest tensile strength.	
<b>Help Received</b> Mrs. Dowdy is my science teacher and was my advisor throughout the experiment. My Father also helped me pull down on the weights to create tension when they became too heavy.	