The Effect of Drumstick Material on Sound Produced

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The research question for my Science Fair Project is: “Does drumstick material effect the properties of the sound waves produced by a drum when struck with the stick?” My hypothesis is that the ticks made of oak will produce the highest amplitude sound waves, the sticks made of maple will produce the lowest amplitude waves, and the sticks made of hickory, and hickory tipped with nylon, will fall in between. I believe the sticks will produce overall similar frequencies. I tested my experiment using 5B Vic Firth drumsticks made of hickory (one pair tipped with nylon and one not), maple, and Japanese white oak. I built a machine that will strike a drum in the same spot with a drum stick with a consistent force. During my experiment I first tested the hickory sticks on the drum and recorded the sound waves produced using sound/frequency analysis software, repeating this four times. I then repeated the entire process using each of the type of stick. Overall my hypothesis was correct, but with less of a difference between tests than expected. Regarding amplitude, the oak had the highest amplitudes that lasted longer, followed by the nylon and hickory, with the maple having the lowest amplitudes. Regarding frequency, while having slight differences, the tests generally produced the same frequencies overall with varying amplitudes. I believed that the amplitude difference was due to the difference in density of the woods, and small frequency variances were caused by wood properties.