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*Smooth Sailing: The Breakdown of Waves*

The qualities of vortices are widely unknown. Their mystery has increased interest in research involving turbulence, formation of vortices, and the cores of many natural occurrences. We studied the vortices of waves and applied them to further our insight on how to construct a personal-sized boat that would be best equipped to break through waves. We constructed 25 different boat designs. We then tested each design by watching and recording how they broke or rode different sized waves. We maintained the waves at a constant level in the first test and built up to stronger waves in successive tests to make the boats fight to stay moving. Based on the designs we tested, there were two designs that were best suited for breaking waves. Our results showed that a smaller acute angle on the front was best for traveling through smaller waves. Also, a boat with a triangular prong extending from the middle of the hull to the top was best for breaking white-capped waves, although it did not glide through calm water very well. We conclude that an effective boat design would have a collapsible prong on the front of the hull to be used as a shock absorber. This would allow family-sized boats more ability to navigate through white-capped waves.