

Aidan Mike
Junior Division Physics
What's the Point? A Ballistic Analysis of Arrowheads

The purpose of this project was to determine how different angled arrowheads effected velocity, penetration of a target, and movement of a target (force). Three different angled arrowheads (40, 60, 80 degrees) were shot five times each through a chronograph into a target set up to swing upon impact. After the five tests averages were calculated to make sure that everything was constant and to determine the mean. When struck by an arrow the target swung and a little plastic strip secured to the bottom of it moved through a tray of salt, creating a line, measuring target movement. All arrows were shot through a chronograph and their velocity was recorded. This ensured that the arrows maintained somewhat constant velocity, and allowed me to measure the difference in velocity between angles of the arrowheads. The arrow's penetration depth was measured for each shot. My data proved that the 40° angle arrowhead had the fastest velocity (average 176.52 FPS), second most target penetration (average 184.2 mm), and the least amount of target movement (average 88 mm). The 60° angle arrowhead had the second highest velocity (average 174.7 FPS), the least amount of penetration (average 176.6 mm), and the most amount of target movement (average 97 mm). The 80° angle arrowhead had the slowest velocity (average 173.38 FPS), most penetration (average 186.4 mm), and the second most target movement (average 96 mm). There was some questionable data due to target integrity, but generally my tests conclude that a more "pointy" arrowhead will be more aerodynamic; move faster, have greater penetration, and move the target the least. The opposite was true for the "blunty" or less aerodynamic arrowheads.