

Executive Summary

The Union University Engineering Department requires its students to design and assemble a device to launch water balloons at various distances. This team was tasked with the design of a catapult or a trebuchet. The need for this project is that students may learn to use mathematical principles in combination with the Engineering Design Method to complete a project.

As stated, the catapult and trebuchet were the two choices. After considering various requirements and constraints, it was decided that the catapult would be an effective choice for this project. It was determined that such a device could launch projectiles the required distance, would remain within the \$100 monetary constraint, and would be easier to use mathematical calculations. Analysis led to a preliminary design of using wood as the main material for the frame, a compound arm, rubber bands as springs, and a hook system for a release mechanism. These components led to a detailed design.



After construction, it was necessary to test the design. Using energy based mathematics it was approximated that the catapult would launch a water balloon approximately 65 to 70 feet with an increased angle. Testing proved this result to be accurate within about 3 feet of the desired target.



This result was achieved precisely and consistently. It was also determined that simply changing the angle allowed for different required distances to be obtained with the same degree of accuracy. The catapult, as seen by testing, is an effective choice for firing water balloons and successfully fulfilled all requirements demanded of it.