Abstract
The objective of this study is to measure the largest launch distance of a trebuchet with varying counterweights.

Methods/Materials
Four meter tall trebuchet (That I constructed at home), measuring tape, multiple counterweights, three 250 gram miniature basketballs. Launched basketballs ten times with each of three counterweights and measured distance.

Results
Identical basketballs were launched ten times with each of three different counterweights and their launch distances were measured. The launch distance correlated directly with the amount of weight.

Conclusions/Discussion
Repeated trials showed that a heavier counterweight increases the velocity of the payload at launch. However, drag and structural soundness are large factors in the launch distance of a trebuchet, and eventually a heavier counterweight may fall short.

Summary Statement
I designed and built a trebuchet and showed that a heavier counterweight increases launch distance, but drag and structural soundness play a large factor.

Help Received
I designed and built the trebuchet myself with general ideas from several trebuchet hobbyist websites. The experiment was conducted by my father, my brother, and myself.