

This is a “verification” lab; instead of working to determine some kind of behavior, you will simply be comparing experimental reality to theoretical predictions of a ball’s launch speed after it has rolled down a track.

First, apply conservation of energy to predict the speed of the ball when it reaches the end of the track. Then, measure how far the ball lands from the track, and how far it fell vertically after leaving the track. Use this data to determine the launch speed. Repeat enough times that you have a large enough set of data that it is valid to apply statistics.

Report your experimental result as

$$v = \bar{v} + \sigma_v$$

where  $\bar{v}$  refers to the average launch speed and  $\sigma_v$  is the standard deviation. Compare your experimental result with theoretical predictions from conservation of energy. For typical measurements made with this equipment, the uncertainty on the theoretical prediction is  $\pm 0.3$  m/s.