

Ballistic Cart

Key words: Projectile, parabola, mechanics



Equipment List:

1. Ballistic cart and ball (small yellow ball from box of balls)
2. PASCO track for cart (1.2m)
3. 3D printed ballistic cart trigger

How to assemble and operate:

- Place the trigger with its foot under the track a bit away from the starting end (around 90-95cm on the ruler is a good place)
- Place the cart on the track with the photogate on the same side as the trigger
- Turn on the cart and depress the ball. The cart will now fire the ball once the photogate is blocked
- If necessary, calibrate the cart by manually triggering the cart and adjusting the aim with the knobs on the sides of the cart. You want the ball to fall back around the center of the cart
- Reset the cart to the start of the track, and give it a push. Observe how the ball falls back into the cart after describing a parabolic arc

Description/Theory:

This demonstration illustrates projectile motion. Specifically, it describes how a projectile launched vertically with a certain horizontal velocity will keep said velocity and describe a parabola in its flight.

Comments/Notes:

The demonstration works best on a completely level surface.