

## Big Idea : Ballistic Pendulum

Website | <https://barisciencelab.tech/L4BallisticPendulum.html>

Q1. A 0.05 kg bullet strikes a 1.3 kg box and displaces it by a height of 4.5 m. After hitting the box, the bullet becomes embedded and remains inside the box. Find the velocity of the bullet-block system after it's hit.

- (a) 6.76 m/s
- (b) 5 m/s
- (c) 9.39 m/s
- (d) 7.67 m/s

Now use the above velocity (of the bullet-block system) to find the bullet's velocity before it hit the box.

- (e) 196.76 m/s
- (f) 100.07 m/s
- (g) 209.39 m/s
- (h) 253.53 m/s

The screenshot shows a simulation interface titled "Ballistic Pendulum Simulation" with a teal background. It includes a "Created by Rashidul Bari" watermark. The simulation area shows a bullet (mass  $m_b = 0.05$  kg) and a wood block (mass  $m_w = 1.3$  kg) suspended by a string. The block is displaced to a height  $h = 4.5$  m. On the left, there are buttons for "Fire", "Reset", and "Pause". Below the simulation, there are input fields for "Mass of Bullet (kg)", "Initial Velocity of Bullet (m/s)", and "Mass of Wood Block (kg)". A checkbox labeled "Show Initial Bullet Velocity" is checked, and the value  $v_b = 248.8$  m/s is displayed. A small icon in the bottom right corner indicates a full-screen or zoom option.

**You have 3 ways to answer the multiple choice challenges above: You can (1) Use No Hints and persevere, (2) Use the Small Hint, (3) Use the Big Hint, or (4) Use the Hands-On Simulation.**