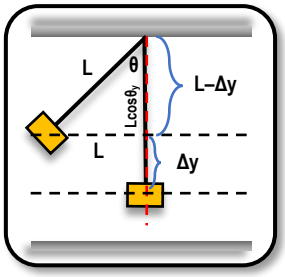
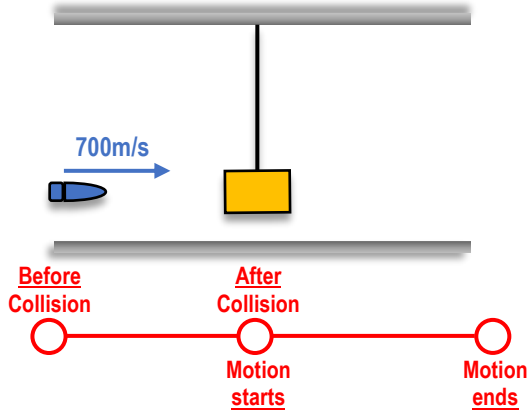
CONCEPT: BALLISTIC PENDULUMS



- Some problems with both collision & motion/energy parts involve pendulums!
  - We solve these by using both Conservation of Momentum & Energy.
  - In these problems, we'll often use the **Pendulum Equation**: $L - \Delta y = L\cos\theta_y$

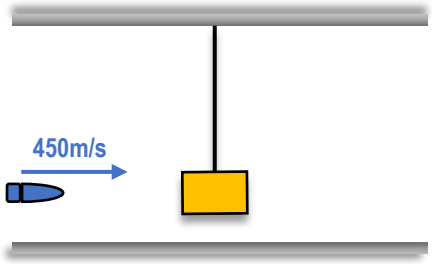
EXAMPLE: A 40-kg block hangs at the bottom of a light 2-m long string, making a pendulum. The block is initially at rest when it is struck by a 0.200-kg bullet travelling at 700m/s. The bullet embeds itself into the block, and the pendulum swings up as a result. Calculate **a)** max height the pendulum will reach; **b)** the angle the pendulum makes with the vertical.



CONSERVATION OF MOMENTUM WITH ENERGY

1) Draw Diagrams, label points of interest
(*Points of Interest: Before/After Collision, end of motion*)
2) Write Momentum & Energy Conservation EQs
3) Plug in values & solve

PROBLEM: A 5.00-g bullet is shot *through* a 1.00-kg wood block suspended on a string 2.00 m long. The center of mass of the block rises a distance of 11cm. Find the speed of the bullet as it emerges from the block if its initial speed is 450 m/s.



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