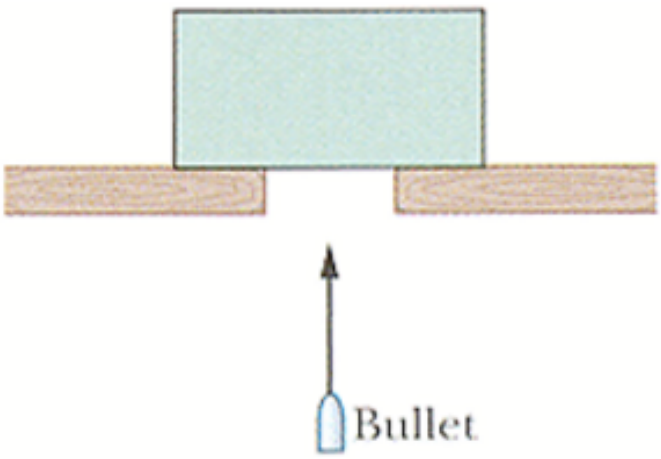
1. **2001 #1 (Impulse)**
2. **1998 #1 (Impulse)**
3. **1995 #1 (Impulse)**
4. **2016 #2 (Collision)**
5. **2015 #2 (Collision)**
6. **2014 #2 (Force)**
7. **2004 #1 (Collision)**
8. **1994 #1 (Collision)**
9. **1993 #1 (Collision)**
10. **In the figure below, a 7 [g] bullet moving directly upward at 1000 [m/s] strikes and passes through the center of mass of a 4 [kg] block initially at rest. The bullet emerges from the block moving directly upward at 300 [m/s]. To what maximum height does the block then rise above its initial position?**



11. **2016 #1 (Force)**

1. Will be completed in class

2. Will be completed in class

3. J = 12 [Ns]
3b. v_x = 2.4 [m/s]
3c. v = 2 [m/s]
3cii Cube is moving to the right
3d. ΔK = 154 [J]
3e. d = 0.2 [m]

4. Will be completed in class

5a. v = 8.7 [m/s]
5b. x = 4.4 [m]
5c. v = 1.4 [m/s]
5d. θ = 24 degrees
5e. SKIP THIS PART
5fi. Increase
5fii. Stay the same

6. Will be completed in class

7a. $v_B = \sqrt{2gL}$

7b. $T = 3m_1 g$

7c. $v_{after} = \frac{m_1}{(m_1 + m_2)}\sqrt{2gL}$

7d. $\frac{K_b}{K_a} = \frac{(m_1 + m_2)}{m_1}$

7e. $x_{total} = \frac{(3m_1 + m_2)L}{m_1 + m_2}$

8a. $U_s = 16$ [J]
8b. $v_1 = 3.9$ [m/s]
8c. $v = 81.9$ [m/s]
8d. For indicating that the maximum compression will be less than 0.4 [m]
8e. The principles of the "Conservation of Energy" and the "Conservation of Momentum"

Conservation of Energy

$$\frac{1}{2}M_1 v_{1i}^2 = \frac{1}{2}M_1 v_{1f}^2 + \frac{1}{2}M_2 v_{2f}^2$$

$$\frac{1}{2}(2.1)(3.9) = \frac{1}{2}(2.1)v_{1f}^2 + \frac{1}{2}(8)v_{2f}^2$$

Conservation of Momentum

$$M_1 v_{1i} = M_1 v_{1f} + M_2 v_{2f}$$

$$(2.1)(3.9) = (2.1)\left(v_{1f}\right) + (8)\left(v_{2f}\right)$$

9a. $U_s = 50$ [J]
9b. $v_c = 4.58$ [m/s]
9c. $v_f = 3.05$ [m/s]
9d. $d = 1.16$ [m]

10. Will be completed in class

11. Will be completed in class