



Find time for the block in the air:

Vertical Motion $\Rightarrow d = d_0 + v_0 t + \frac{1}{2} a t^2$
 $1\text{m} = \frac{1}{2}(9.8\text{m/s}^2) \cdot t^2$

$$t = .45\text{ s}$$

Find velocity of the block as it leaves the table:

Horizontal Motion $\Rightarrow d = d_0 + v_0 t + \frac{1}{2} a t^2$
 $2\text{m} = v_0 \cdot (.45\text{ sec})$

$$v_0 = 4.4\text{ m/s}$$

From conservation of momentum:

Bullet			Block
$m_1 = .008\text{ kg}$		$m_2 = .250\text{ kg}$	
$v_1 = ?$		$v_2 = 0\text{ m/s}$	
$v' = 4.4\text{ m/s}$ (from above)			

$$p_1 + p_2 = p_1' + p_2'$$

$$m_1 \cdot v_1 + m_2 \cdot v_2 = (m_1 + m_2) \cdot v'$$

$$(.008\text{ kg}) \cdot v_1 + 0 = (.008\text{ kg} + .25\text{ kg}) \cdot (4.4\text{ m/s})$$

$$v_1 = 143\text{ m/s}$$