32. For a picture of this one-dimensional example of an "explosion" involving two objects ($m_1 = 4.0$ kg and $m_2 = 6.0$ kg), see Fig. 9-40 (but reverse the velocity arrows). Since the system was initially at rest, momentum conservation leads to

$$0 = m_2\vec{v}_2 + m_1\vec{v}_1 \quad \Longrightarrow \quad |\vec{v}_1| = \frac{m_2}{m_1}\,|\vec{v}_2|$$

which yields 6.0 m/s for the speed of the physics book. Mechanical energy conservation tells us that the initial potential energy is

$$U_i = K_{f\,\mathrm{total}} = \frac{1}{2}m_1v_1^2 + \frac{1}{2}m_2v_2^2$$

which gives the result $U_i = 120$ J.