28. We choose $+x$ in the direction of (initial) motion of the blocks, which have masses $m_1 = 5$ kg and $m_2 = 10$ kg. Where units are not shown in the following, SI units are to be understood.

(a) Momentum conservation leads to

$$\begin{aligned} m_1\vec{v}_{1i} + m_2\vec{v}_{2i} &= m_1\vec{v}_{1f} + m_2\vec{v}_{2f} \\ (5)(3) + (10)(2) &= 5\vec{v}_{1f} + (10)(2.5) \end{aligned}$$

which yields $\vec{v}_{1f} = 2$. Thus, the speed of the 5 kg block immediately after the collision is 2.0 m/s.

(b) We find the reduction in total kinetic energy:

$$K_i - K_f = \frac{1}{2}(5)(3)^2 + \frac{1}{2}(10)(2)^2 - \frac{1}{2}(5)(2)^2 - \frac{1}{2}(10)(2.5)^2$$

which gives the result 1.25 J. Rounding to two figures and recalling that $\Delta K = K_f - K_i$ then our answer is $\Delta K = -1.3$ J.

(c) In this new scenario where $\vec{v}_{2f} = 4.0$ m/s, momentum conservation leads to $\vec{v}_{1f} = -1.0$ m/s and we obtain $\Delta K = +40$ J.

(d) The creation of additional kinetic energy is possible if, say, some gunpowder were on the surface where the impact occurred (initially stored chemical energy would then be contributing to the result).