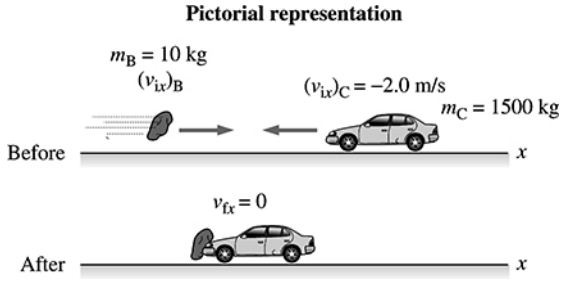
9.19. **Model:** Because of external friction and drag forces, the car and the blob of sticky clay are not exactly an isolated system. But during the collision, friction and drag are not going to be significant. The momentum of the system will be conserved in the collision, within the impulse approximation.

Visualize:



Solve: The conservation of momentum equation $p_{fx} = p_{ix}$ is

$$(m_C + m_B)(v_f)_x = m_B(v_{ix})_B + m_C(v_{ix})_C$$

$$\Rightarrow 0 \text{ kg m/s} = (10 \text{ kg})(v_{ix})_B + (1500 \text{ kg})(-2.0 \text{ m/s}) \Rightarrow (v_{ix})_B = 3.0\times10^2 \text{ m/s}$$

Assess: This speed of the blob is around 600 mph, which is very large. However, we must point out that a very large speed is *expected* in order to stop a car with only 10 kg of clay.