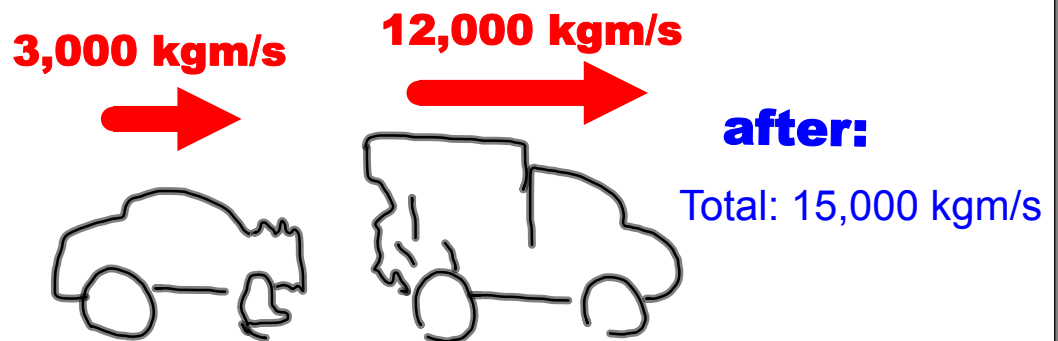
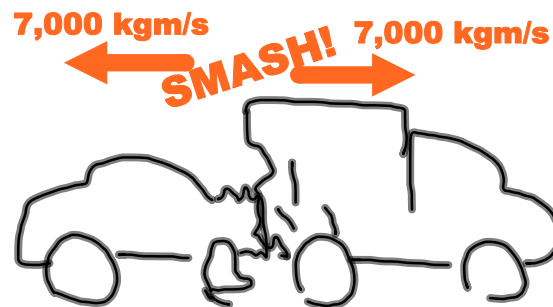
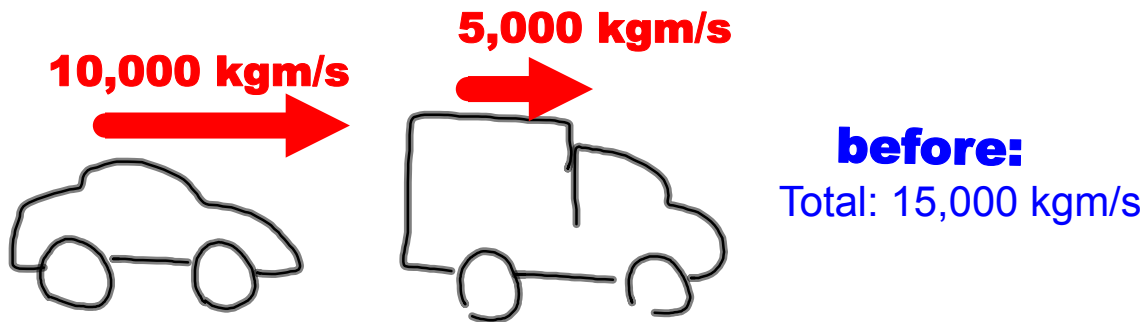
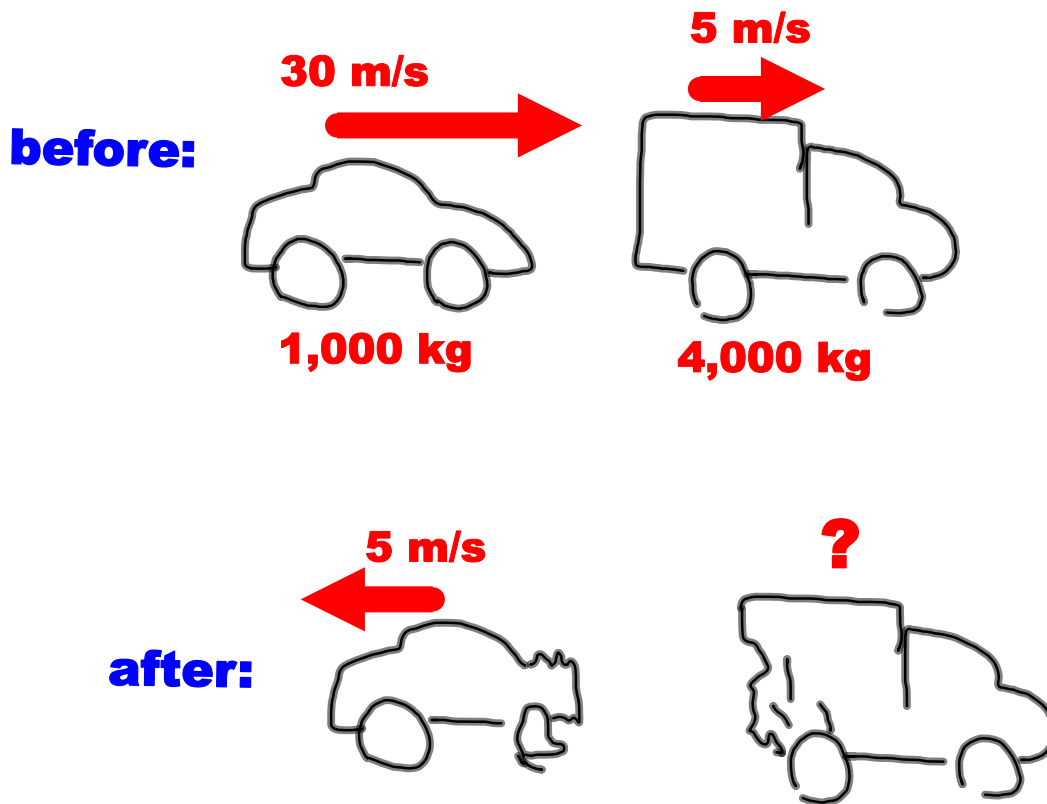


**In a collision, if one object loses momentum,  
the other gains it.**



**Thus the total momentum never changes**

(problems usually look more like this)



Set the total momentum before equal to the total momentum after.  
Then solve for what you don't know

**before:**

**after:**

$$(1,000 \text{ kg})(30 \text{ m/s}) + (4,000 \text{ kg})(5 \text{ m/s}) = (1,000 \text{ kg})(-5 \text{ m/s}) + (4,000 \text{ kg})(v)$$

$$(30,000 \text{ kgm/s}) + (20,000 \text{ kgm/s}) = (-5,000 \text{ kgm/s}) + (4,000 \text{ kg})(v)$$

$$(50,000 \text{ kgm/s}) = (-5,000 \text{ kgm/s}) + (4,000 \text{ kg})(v)$$

$$(55,000 \text{ kgm/s}) = (4,000 \text{ kg})(v)$$

$$13.75 \text{ m/s} = v$$