


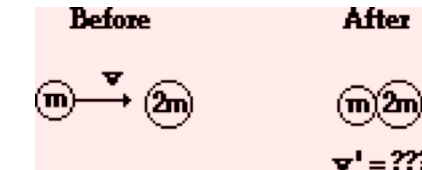
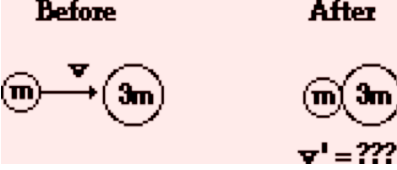

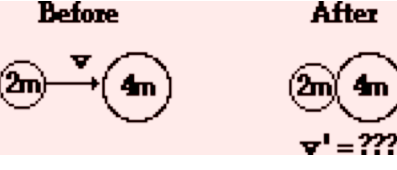
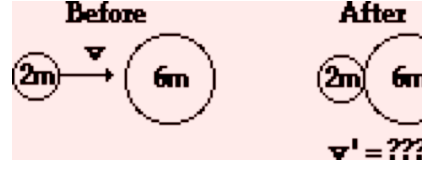
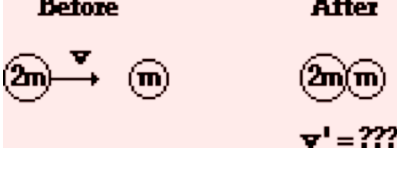
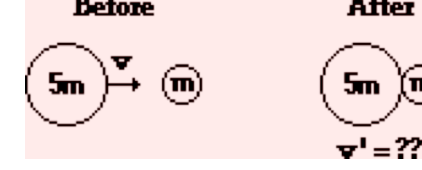
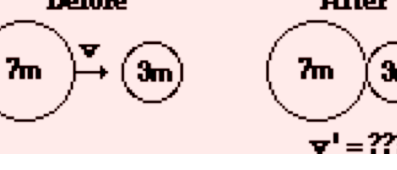

Momentum Conservation as a Guide to Thinking

Read from Lesson 2 of the Momentum and Collisions chapter at The Physics Classroom:

<http://www.physicsclassroom.com/Class/momentum/u4l2dd.html>

MOP Connection: Momentum and Collisions: sublevel 10

1. The following diagrams depict inelastic collisions between objects of different mass. For each case, determine the post-collision velocity (v') of the two *coupled* objects. Express v' in terms of v .

<p>a.</p>  <p>Before: $m \xrightarrow{v} m$ After: $(m)(m)$ $v' = ???$</p>	<p>b.</p>  <p>Before: $m \xrightarrow{v} (2m)$ After: $(m)(2m)$ $v' = ???$</p>
<p>c.</p>  <p>Before: $m \xrightarrow{v} (3m)$ After: $(m)(3m)$ $v' = ???$</p>	<p>d.</p>  <p>Before: $m \xrightarrow{v} (5m)$ After: $(m)(5m)$ $v' = ???$</p>
<p>e.</p>  <p>Before: $(2m) \xrightarrow{v} (4m)$ After: $(2m)(4m)$ $v' = ???$</p>	<p>f.</p>  <p>Before: $(2m) \xrightarrow{v} (6m)$ After: $(2m)(6m)$ $v' = ???$</p>
<p>g.</p>  <p>Before: $(2m) \xrightarrow{v} m$ After: $(2m)(m)$ $v' = ???$</p>	<p>h.</p>  <p>Before: $(5m) \xrightarrow{v} m$ After: $(5m)(m)$ $v' = ???$</p>
<p>i.</p>  <p>Before: $(7m) \xrightarrow{v} (3m)$ After: $(7m)(3m)$ $v' = ???$</p>	<p>j.</p>  <p>Before: $(2m) \xrightarrow{v} (5m)$ After: $(2m)(5m)$ $v' = ???$</p>

Momentum and Collisions

2. Complete the following verbal statements to illustrate your understanding of the effect of varying mass on the post-collision velocity.
- If an object of mass m collides and velocity v collides inelastically with an object of mass $3m$ that is initially at rest, then the amount of total *system* mass in motion will increase by a factor of _____ and the velocity of the system will decrease by a factor of _____. The new velocity (v') will be _____ v .
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 - If an object of mass $3m$ collides and velocity v collides inelastically with an object of mass $4m$ that is initially at rest, then the amount of total *system* mass in motion will increase by a factor of _____ and the velocity of the system will decrease by a factor of _____. The new velocity (v') will be _____ v .
 - If an object of mass $5m$ collides and velocity v collides inelastically with an object of mass $3m$ that is initially at rest, then the amount of total *system* mass in motion will increase by a factor of _____ and the velocity of the system will decrease by a factor of _____. The new velocity (v') will be _____ v .
3. Use proportional reasoning to determine the unknown quantity in the following collisions.

<p>a.</p> <table border="1" style="width: 100%; border-collapse: collapse; background-color: #f0f0f0;"> <thead> <tr> <th style="width: 50%; text-align: center;">Before</th> <th style="width: 50%; text-align: center;">After</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> </tbody> </table>	Before	After			<p>b.</p> <table border="1" style="width: 100%; border-collapse: collapse; background-color: #f0f0f0;"> <thead> <tr> <th style="width: 50%; text-align: center;">Before</th> <th style="width: 50%; text-align: center;">After</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> </tbody> </table>	Before	After		
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