

October 29, 2010 Physics 121 Prof. E. F. Redish

■ **Theme Music: Kenny Rogers**

Every Time Two Fools Collide

■ **Cartoon: Jef Mallett**

Frazz

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Outline

- Recap: Mechanical Energy Conservation
- Examples
- Collisions

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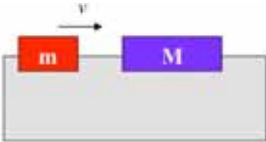
Collisions

- When the objects in a system collide, conservation laws limit what can happen.
- If all external forces cancel, momentum will be conserved.
- If all forces are conservative (no friction, drag, or deformation), mechanical energy will be conserved.

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Inelastic Collisions

- If two objects collide and stick together, the collision is called inelastic.
- In this case, momentum conservation tells all we need to know. ME is not conserved.



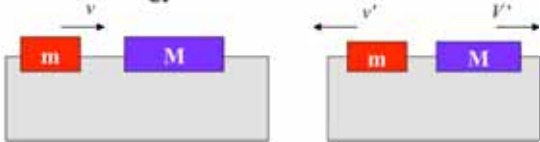
$$mv = (m + M)V$$

$$V = \frac{m}{m + M}v$$

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Elastic Collisions

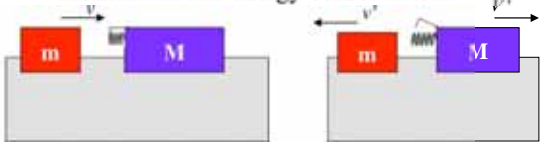
- If two objects collide and bounce off, without losing any mechanical energy the collision is called elastic.
- In this case, we have to use both momentum and energy conservation.



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Superelastic Collisions

- If two objects collide and bounce off, and mechanical energy is added in the interaction the collision is called superelastic.
- In this case, we might have to use both momentum and energy conservation.



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