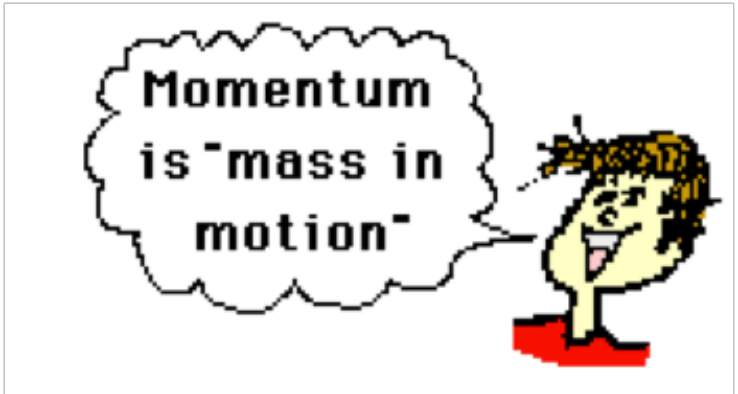
Conservation of Momentum and Inelastic Collisions

What is momentum?

Momentum

- Momentum is often described as “inertia in motion”
- Momentum = mass • velocity
- $p = m \bullet v$
- The unit of momentum is the kg m/s
- Momentum is a vector, so DIRECTION MATTERS(+ or -)



Collisions

- What are the types of collisions?
- What is the difference?

Range of Possible Collisions

Total Splat!

(Stick)

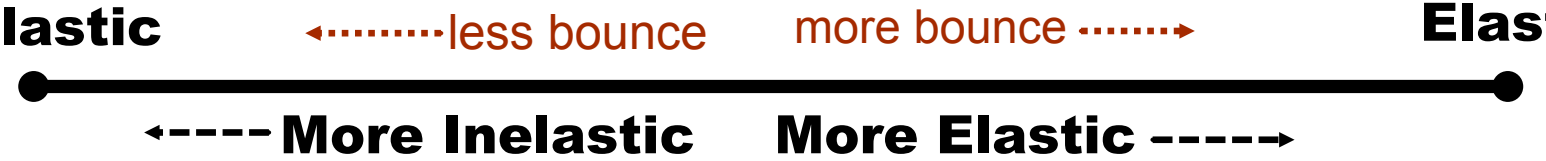
Completely

Inelastic

The Perfect Bounce

Completely

Elastic



Inelastic collisions involve "sticking". In inelastic collisions, objects are deformed as a result of the interaction. A good example is a car accident.

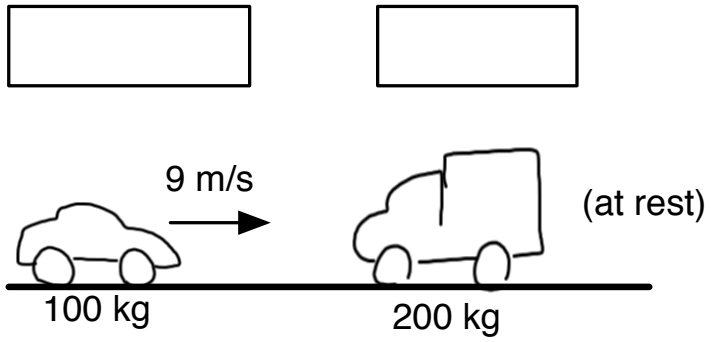
Elastic collisions involve "bouncing". In elastic collisions, objects retain their original shape. A good example is a pool table.

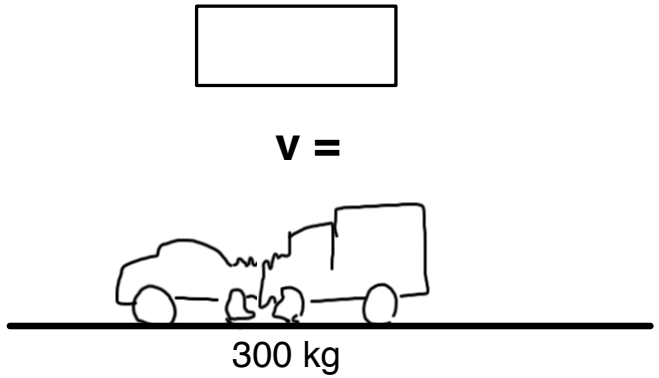
Inelastic Examples

Conservation of Momentum

Total Momentum BEFORE a Collision = **Total Momentum AFTER a Collision**

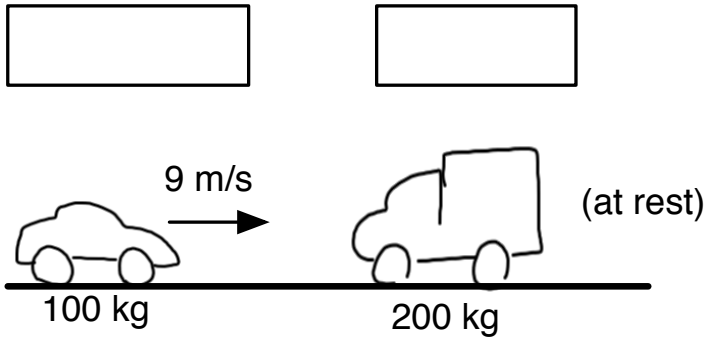
(ex) | total momentum before | | | total momentum after | |

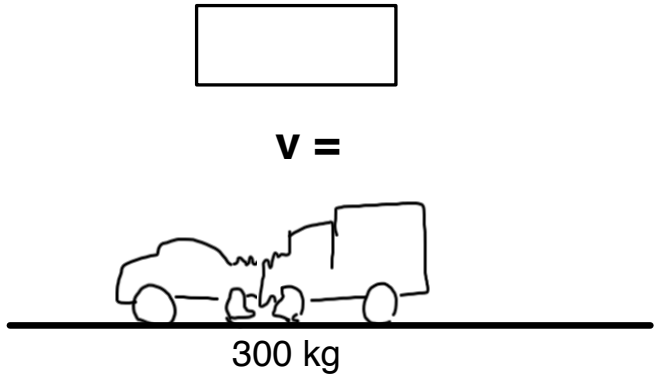




Find the velocity: how much and which way.

(ex) | total momentum before | | | total momentum after | |





Find the velocity: how much and which way.

- Momentum = mass • velocity
- p = m • v

Total Momentum BEFORE a Collision = **Total Momentum AFTER a Collision**

(1)

total momentum before	

total momentum after	

800 kgm/s	0

v =

Find the velocity: how much and which way.

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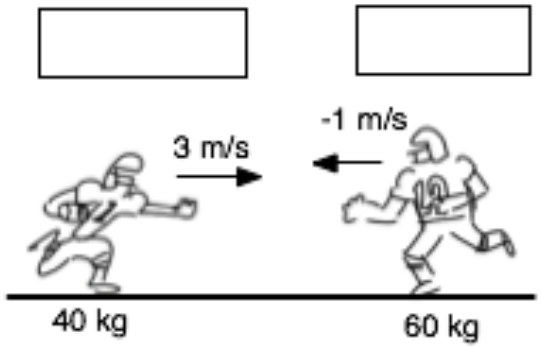
(2)

total momentum before	

total momentum after	



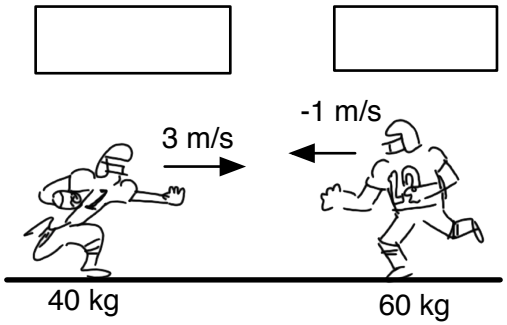
v =

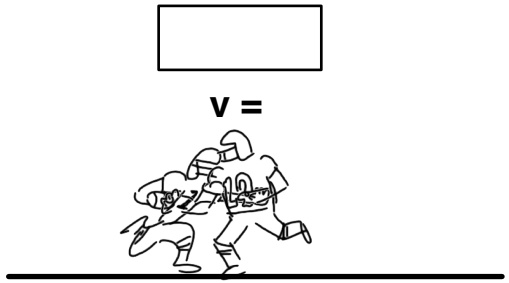
Find the velocity: how much and which way.
(Decimal answer)

total momentum before	

total momentum after	

(2)





Find the velocity: how much and which way.
(Decimal answer)

- Momentum = mass • velocity
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Total Momentum BEFORE a Collision = **Total Momentum AFTER a Collision**