Nov 06, 2015 LB 273, Physics I

Prof. Vashti Sawtelle
Prof. Leanne Doughty

Today:
Chapter 11 – Conservation of Momentum
Chapter 8 – Circular Motion

Irish Phrasebook

Lets make shapes – *Lets get out of here*

Announcements

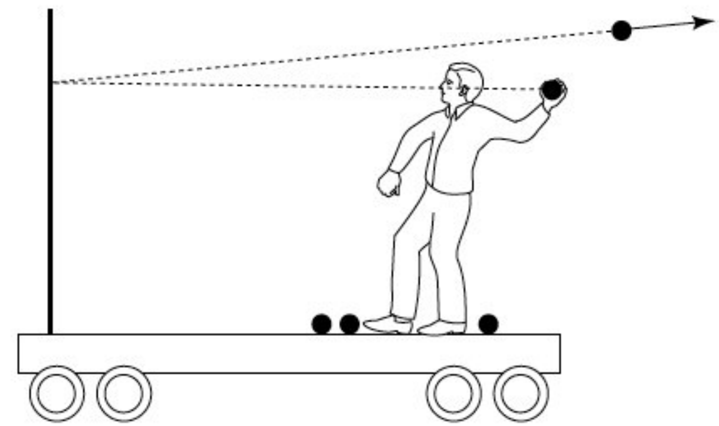
- Upcoming assignments:

  - LON-CAPA HW for Ch8 due Fri. 13th (will open later today)

  - Reading Q's for Ch9 due Tues. 10th

Suppose you are on a cart, initially at rest on a track with negligible friction.

You throw balls at a partition that is rigidly mounted on the cart. The balls bounce straight back as shown in the figure.

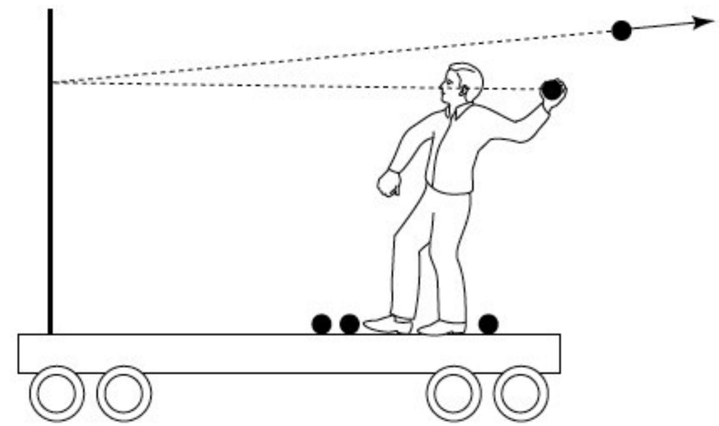


Is the cart put in motion?

A. Yes. Towards the left
B. Yes. Towards the right.
C. No.
D. You are not given enough information to decide.

Suppose you are on a cart, initially at rest on a track with negligible friction.

You throw balls at a partition that is rigidly mounted on the cart. The balls bounce straight back as shown in the figure.



Is the cart put in motion?

A. Yes. Towards the left
B. Yes. Towards the right.
C. No.
D. You are not given enough information to decide.

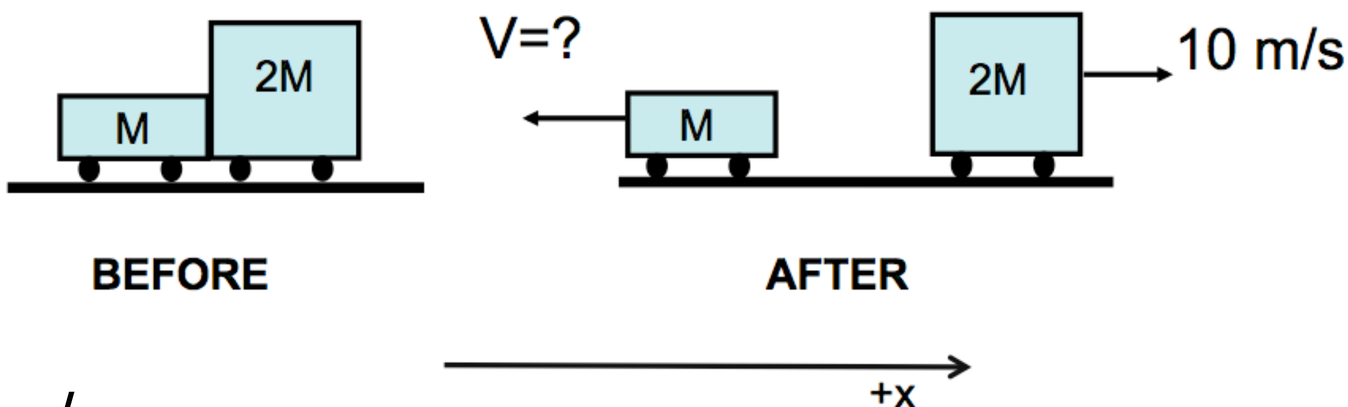
If everything is in the system – then momentum is conserved. So the balls shooting off to the right means the cart must move to the left.

Types of Collisions

- "Elastic" -> collide and don't stick together
- "Inelastic" -> collide and stick together

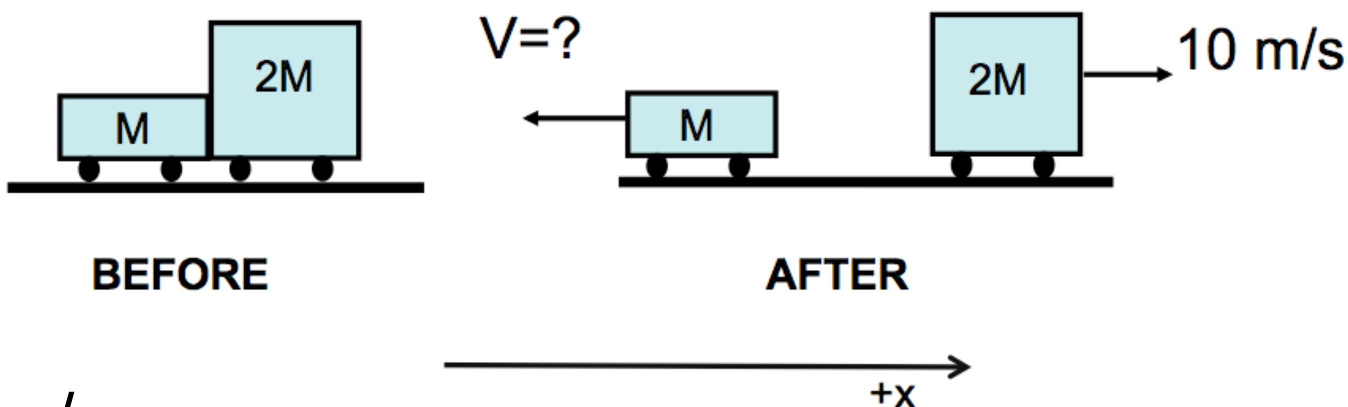
As long as both objects are in the system, momentum is conserved in both types of collisions

Two cars are initially at rest on a frictionless surface and are blown apart by an explosion. The one with twice the mass ends up moving to the right at 10 meters/second. The less massive car ends up moving to the left at what speed?



A. 5 m/s
B. 10 m/s
C. 14.1 m/s
D. 20 m/s
E. 25 m/s

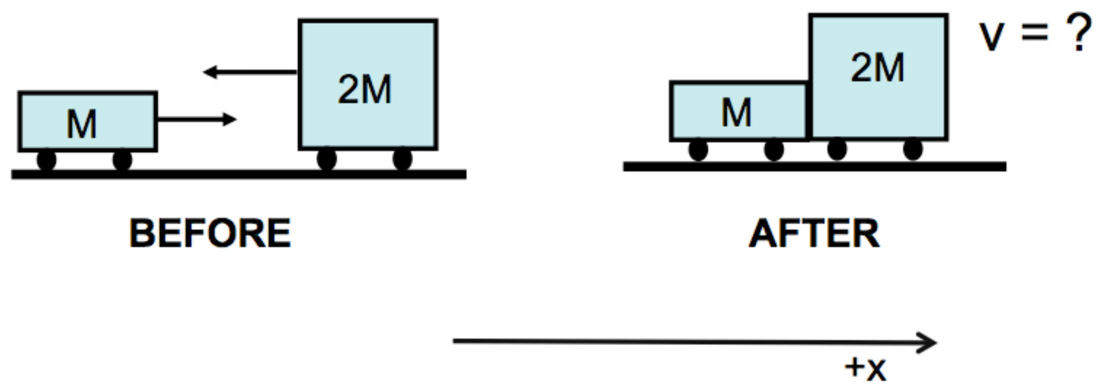
Two cars are initially at rest on a frictionless surface and are blown apart by an explosion. The one with twice the mass ends up moving to the right at 10 meters/second. The less massive car ends up moving to the left at what speed?



A. 5 m/s
B. 10 m/s
C. 14.1 m/s
D. 20 m/s
E. 25 m/s

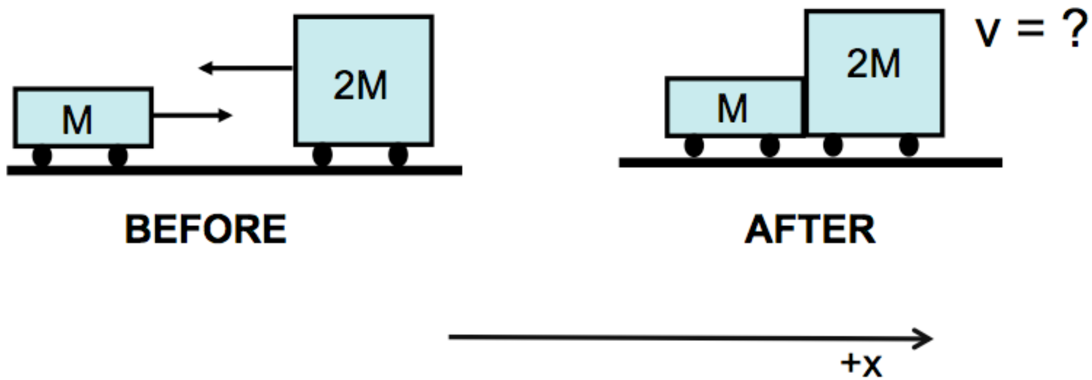
If we think of the explosion as a force that changes the momentum of both carts; then the change in momentum must be equal. So if one cart is 2M of the other, the smaller one must go 2V = 20 m/s.

A car with a mass M is moving toward another car with a mass 2M on a frictionless surface. Both cars have a speed of 10 m/s. Subsequently, they collide and stick together. What is the final velocity of the system?



A. -5 m/s
B. -3.33 m/s
C. 0 m/s
D. +3.33 m/s
E. +5 m/s

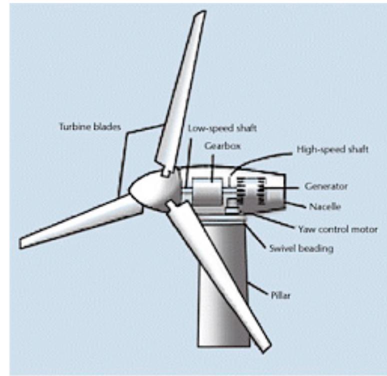
A car with a mass M is moving toward another car with a mass 2M on a frictionless surface. Both cars have a speed of 10 m/s. Subsequently, they collide and stick together. What is the final velocity of the system?



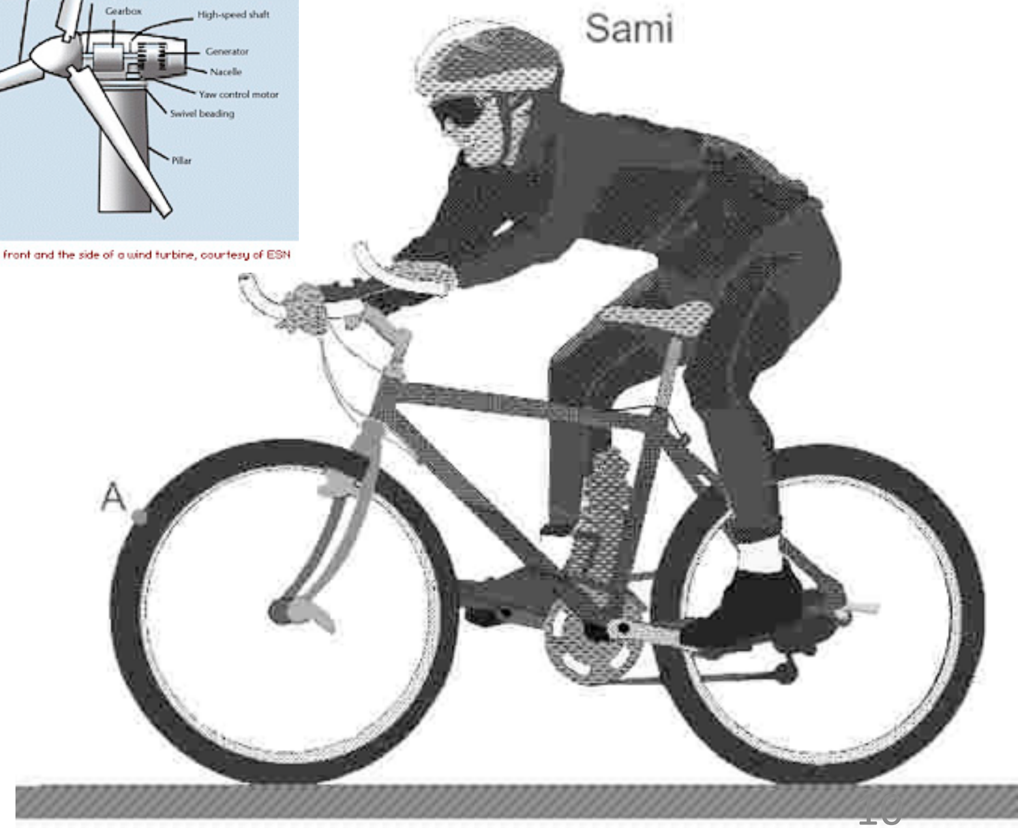
A. -5 m/s
B. -3.33 m/s
C. 0 m/s
D. +3.33 m/s
E. +5 m/s

P(i) = p(f)
Initial: m(10) – 2M (10) = -10 (M) m/s
Final: (m+2M)v = -10(M) m/s
so v = -3.33 m/s

Chapter 8 –
Turning the corner: 2D/3D motion



Drawing of the front and the side of a wind turbine, courtesy of ESN



Reading Questions

Can you address circular motion as a model for more complex motions with an example on how to do so?

I need help finding out where the position and velocity vectors point in regards to an orbit

I'm not sure I understand what centripetal force is exactly.

A lot of the equations and symbols were hard to interpret.

Hitting a ball so it moves in a circle - Observation experiment

http://paer.rutgers.edu/pt3/experiment.php?topicid=5&exptid=56