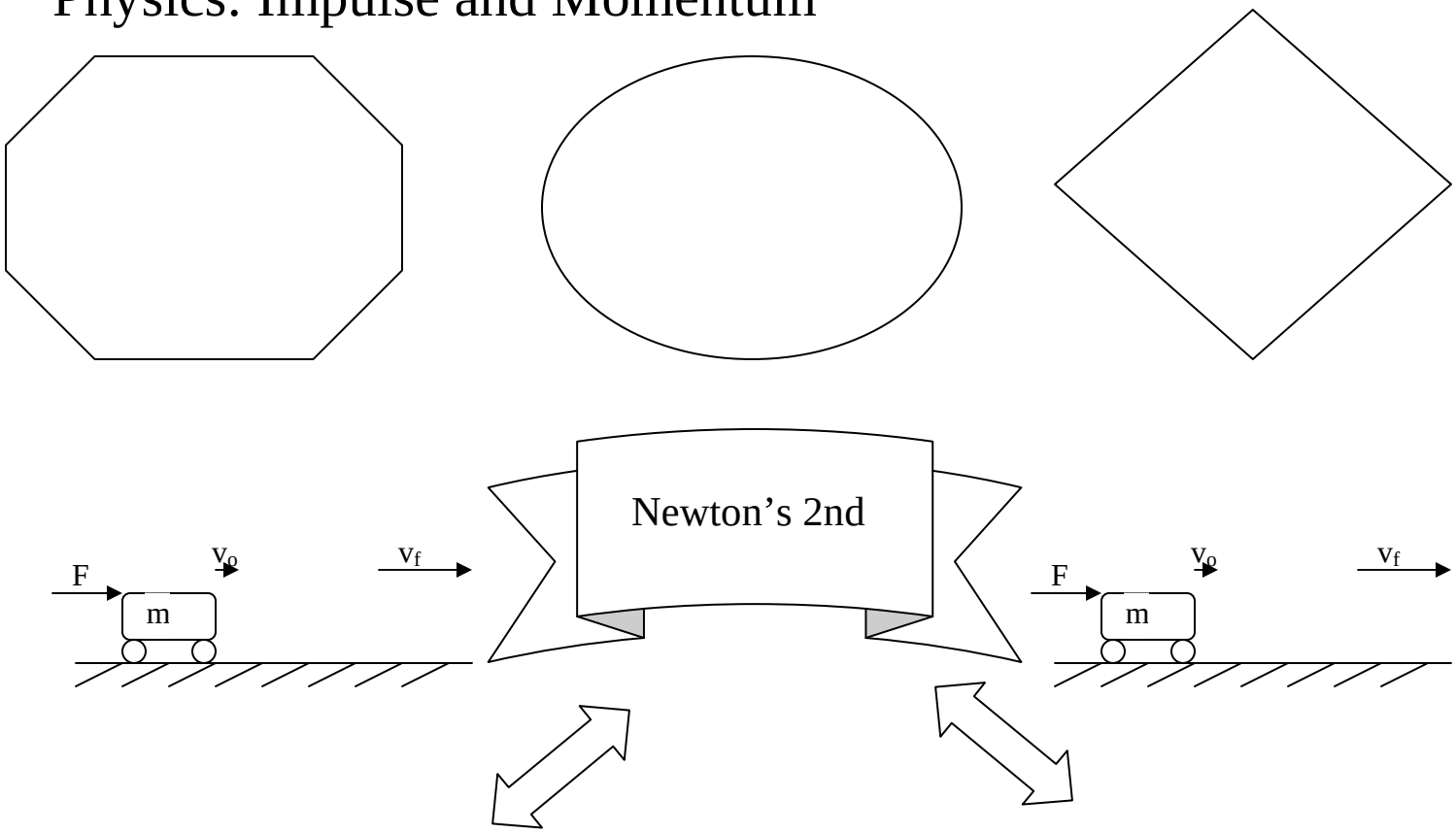
Name:_____

Per:_____

Physics: Impulse and Momentum



Momentum
Force and_____

1)

2)

3)

Energy
Force and_____

1) Work Energy Theorem
$W_{net} = \Delta KE$

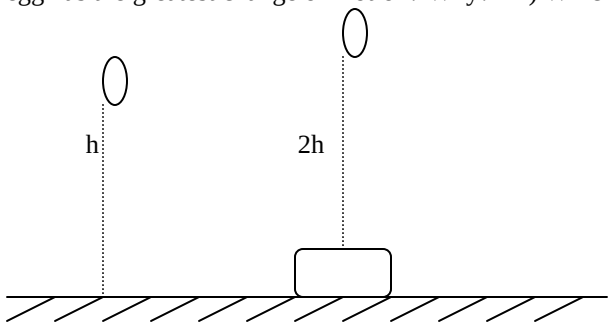
2) Conservation of Energy
$\sum E_o = \sum E_f$

3) F vs. D (graphs)

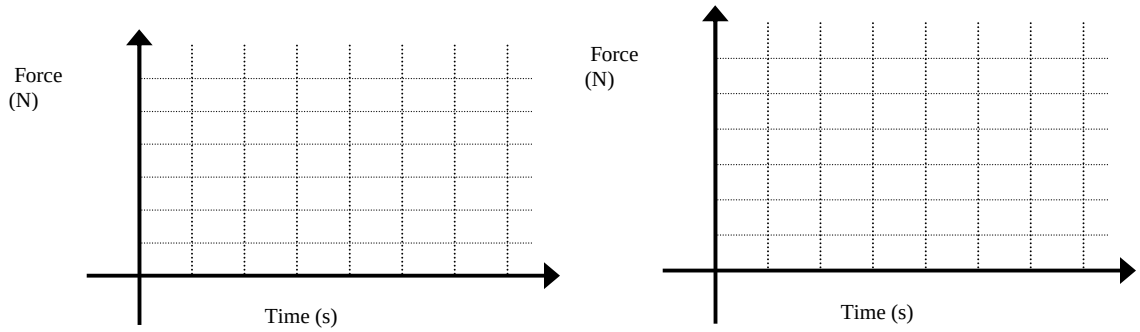
What types of things have momentum ?

Mass	Velocity	
Big Tom (400lb)	10mph	
_____ (200 lb)	?	
_____(100 lb)		
_____ (20 lb)		

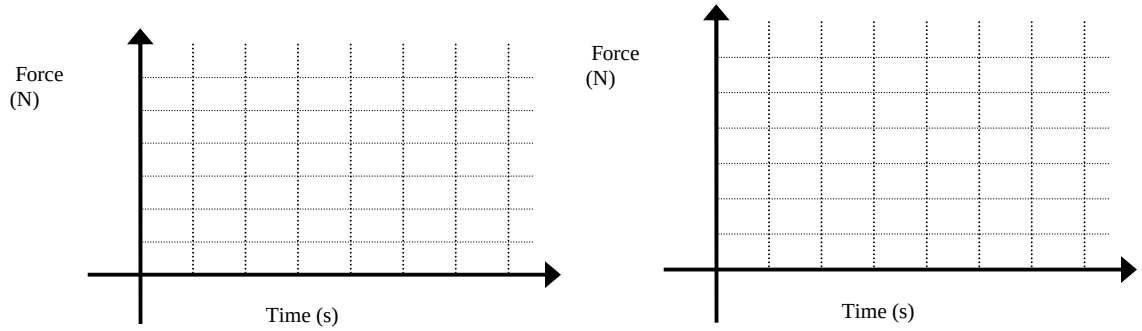
1) Egg drop-1 is drop from height h and breaks on the ground egg-2 is dropped from 2h and lands on a pillow and doesn't break.
A) Which egg has the greatest change of motion? Why? B) Which egg has the greatest force? Why?



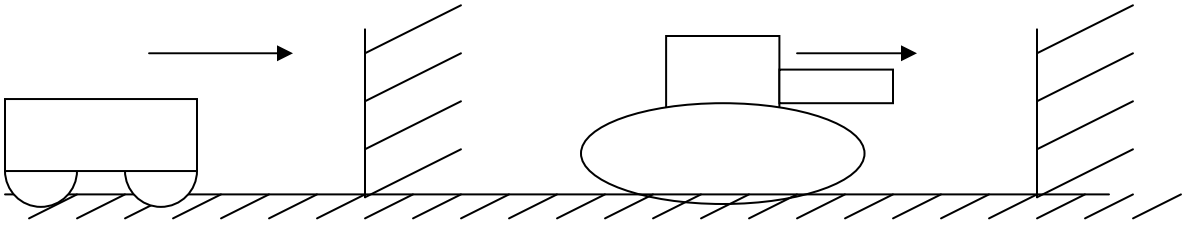
2) In car crashes we want to minimize the damage to occupants without forcing everyone to drive slower. How? (consider a graph)



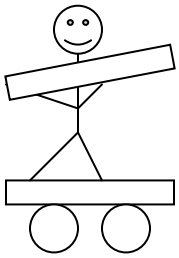
3) Athletes want to maximize Collisions with out increasing the force? How? (consider a graph)

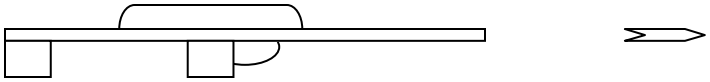


4) Honda vs Tank: would you rather be in a Honda Del sol or the tank when driving at 50 mph and crashing into the immovable wall?

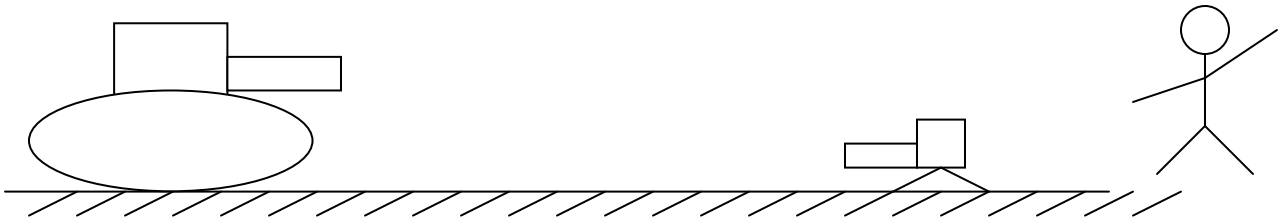


5) Recoilless Gun (World War I) A) How could you minimize the recoil of the gun? B) How do you develop a gun without any recoil?

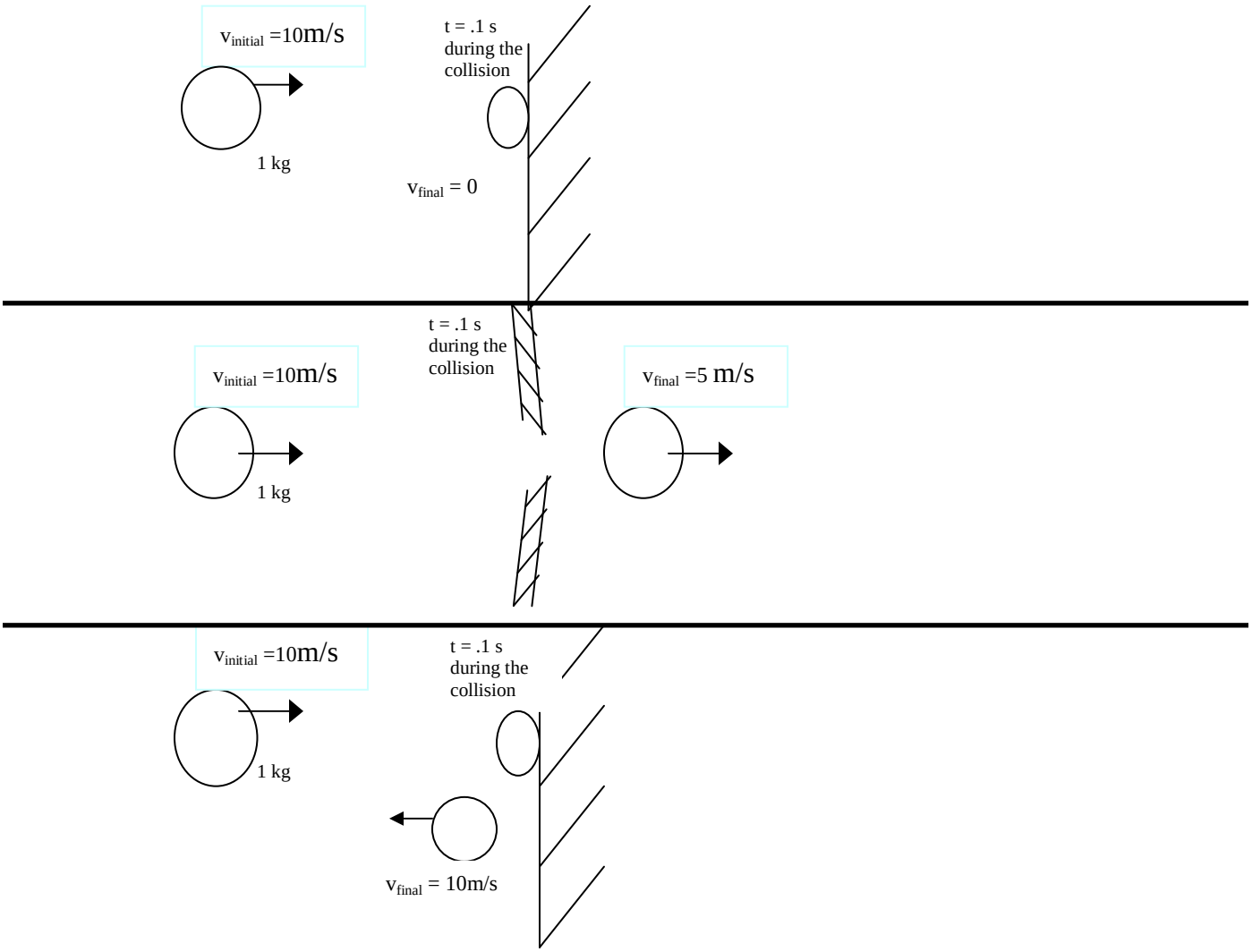




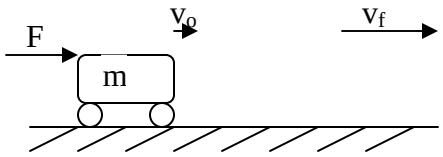
6) Save Billy (Bounce or stick): To stop the tank you can fire your bullets from the machine gun into the barrel and have them stick or you could fire them so they bounce off the front of the tank. What is the best way to stop a tank?

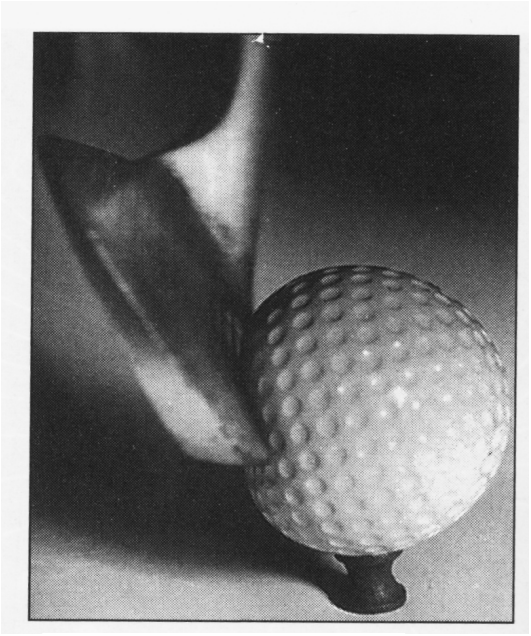


7) Find the force in each of these situations



Impulse and Momentum





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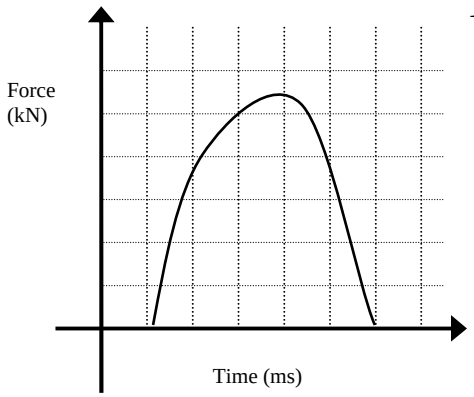
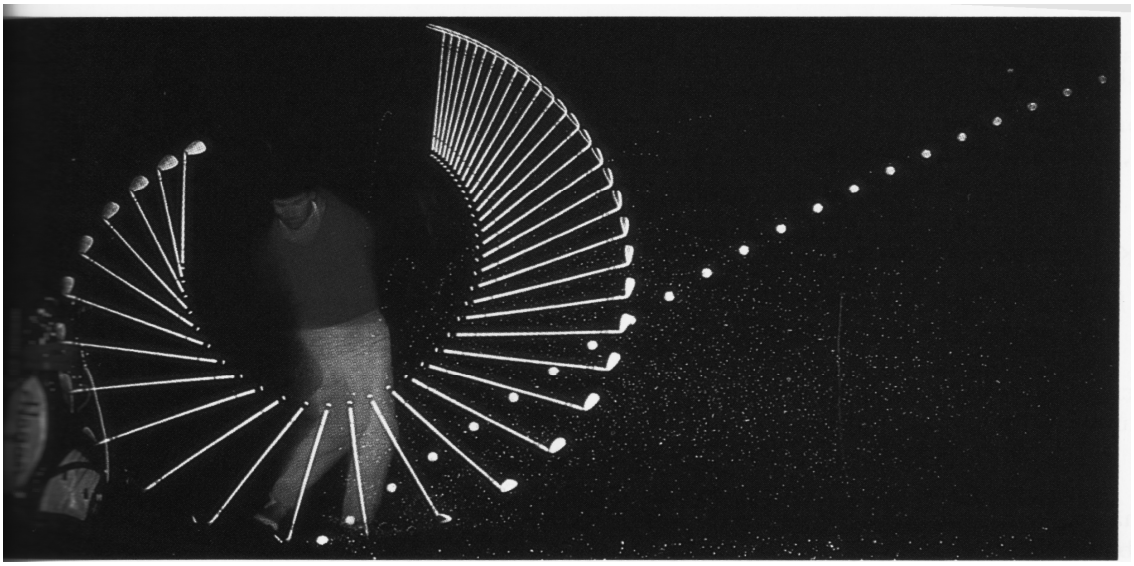


1) $\int \vec{F}dt = \vec{p}_f - \vec{p}_i$

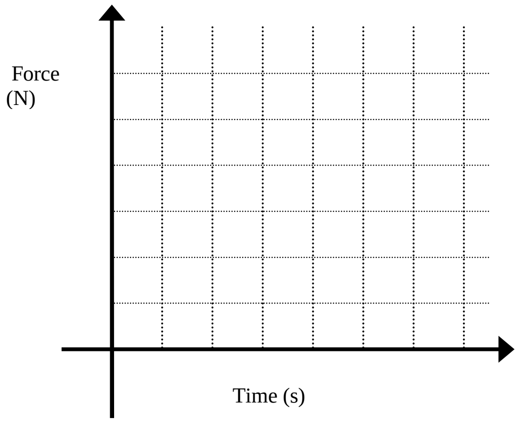
2) $\vec{F}\Delta t = \vec{p}_f - \vec{p}_o$

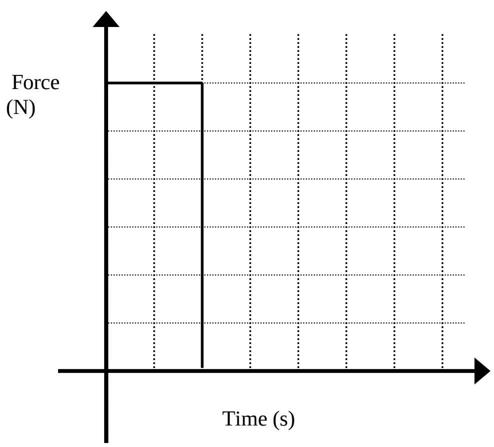
What's the Impulse? What's the change in momentum? What is the average force?

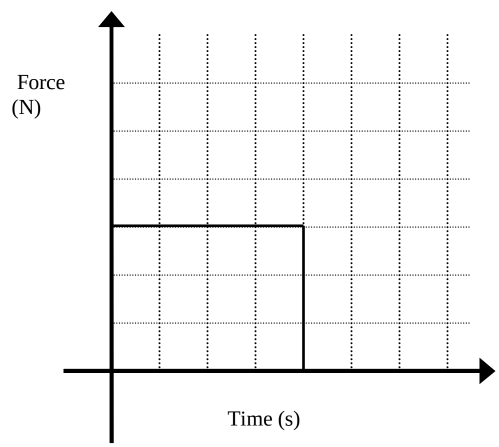


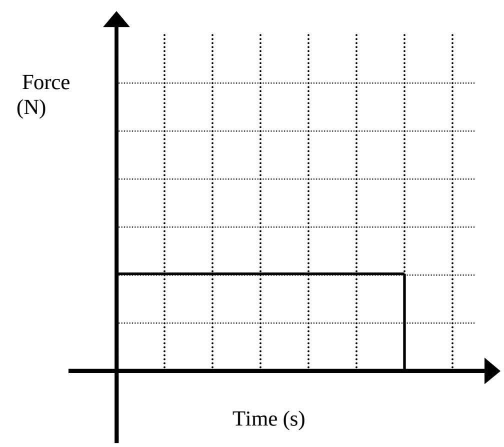
Michel Hans/Photo Researchers, Inc

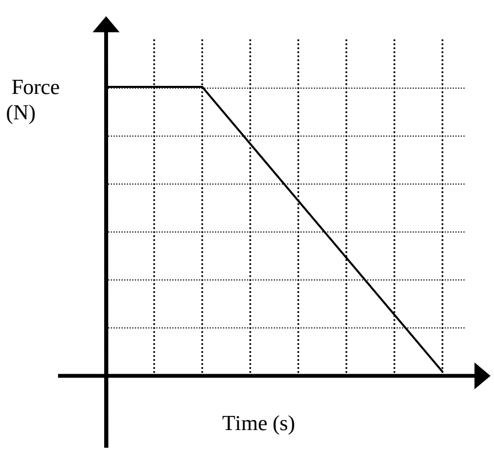
Impulse and Graphs

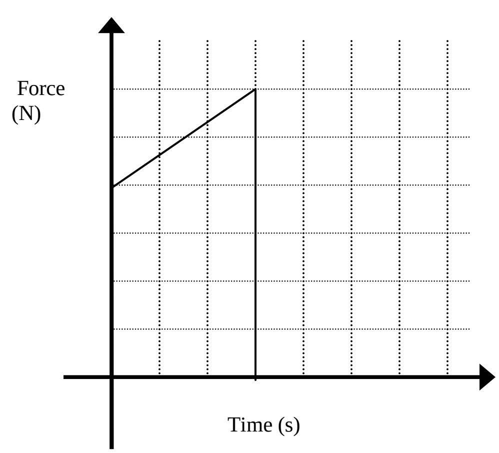


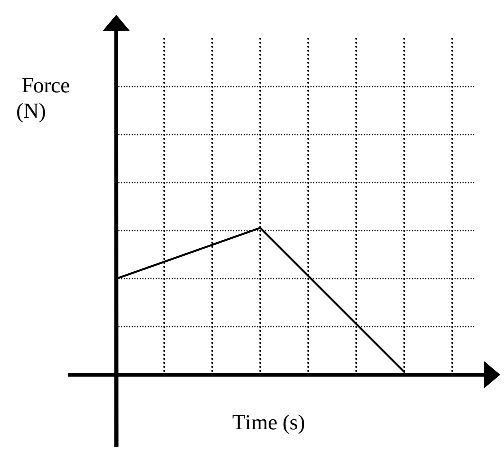




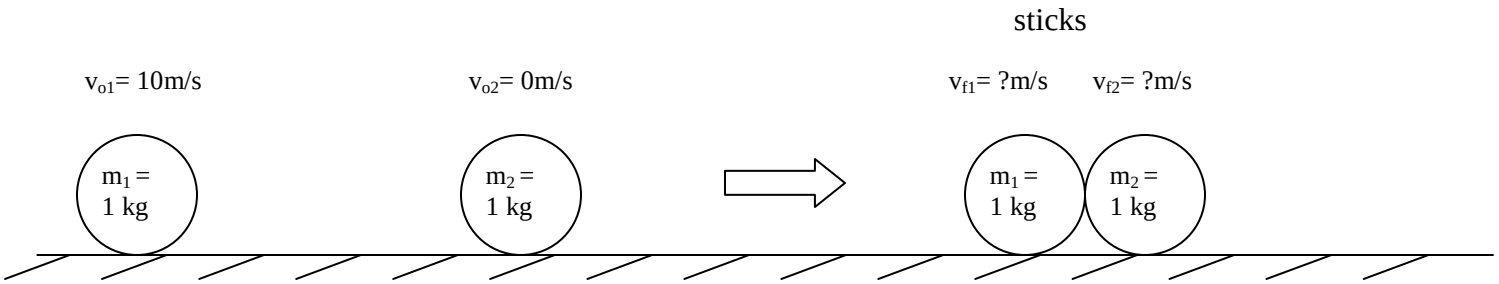


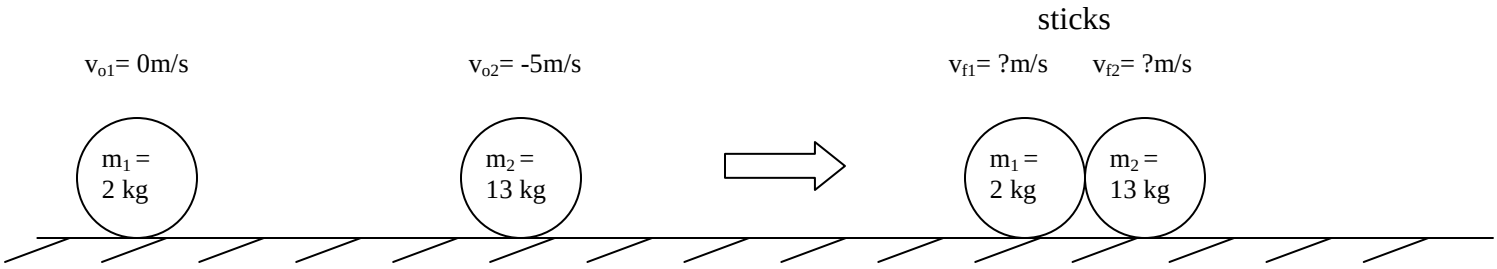


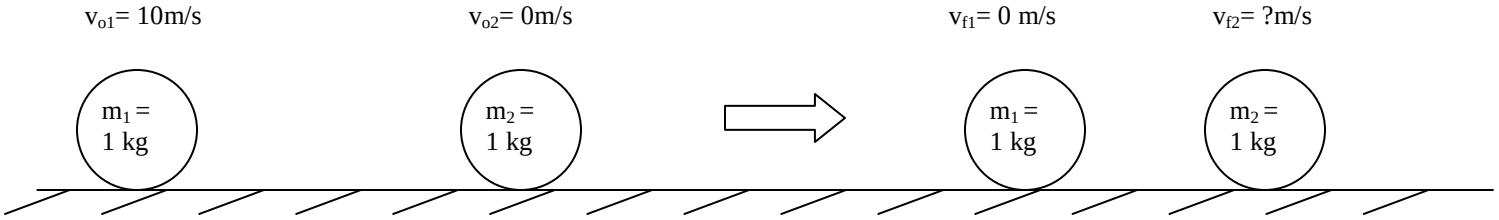


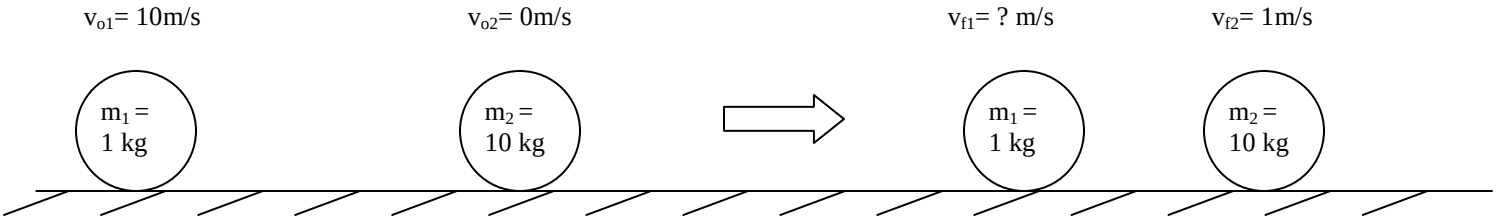


Conservation of Momentum

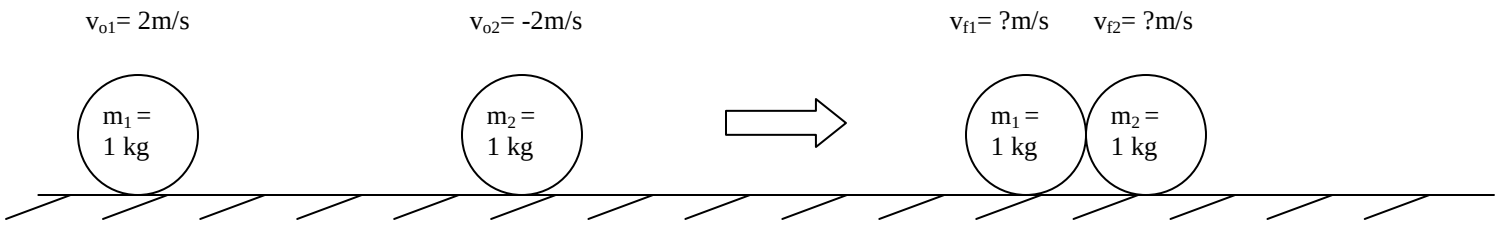


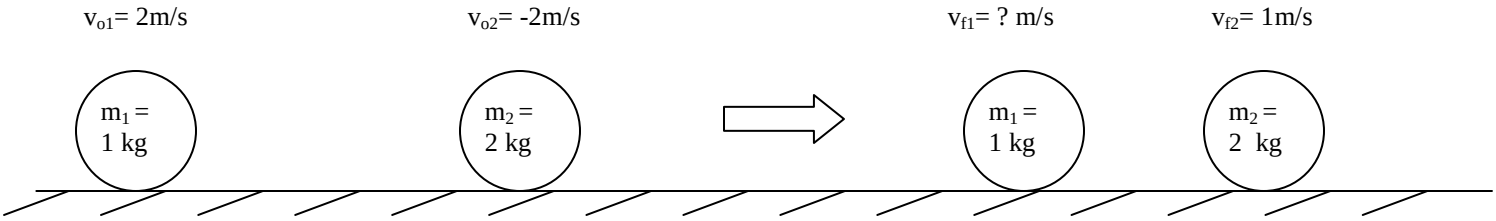




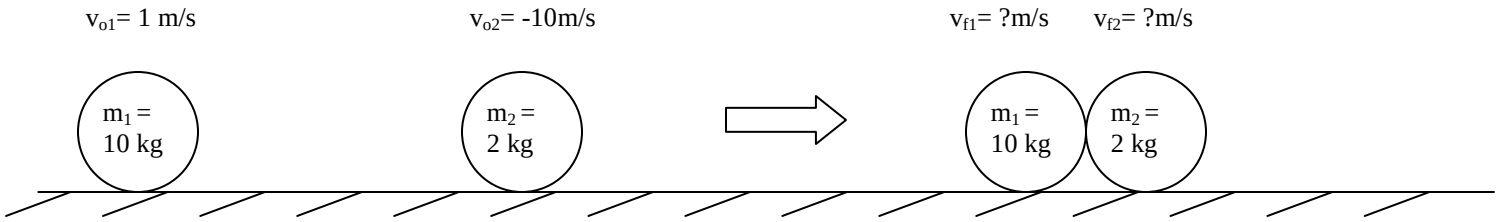


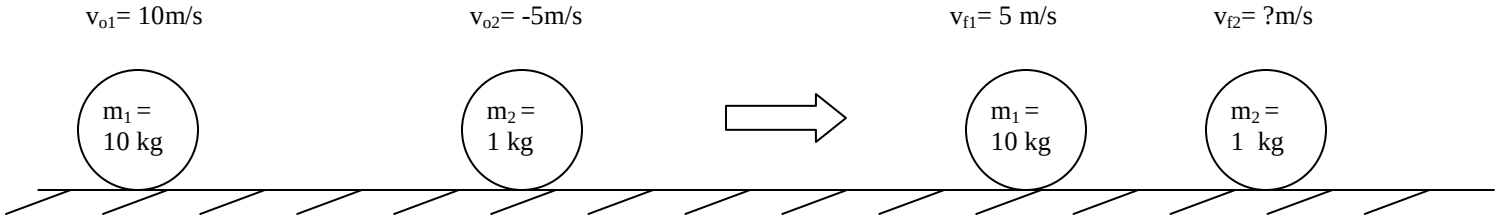
sticks

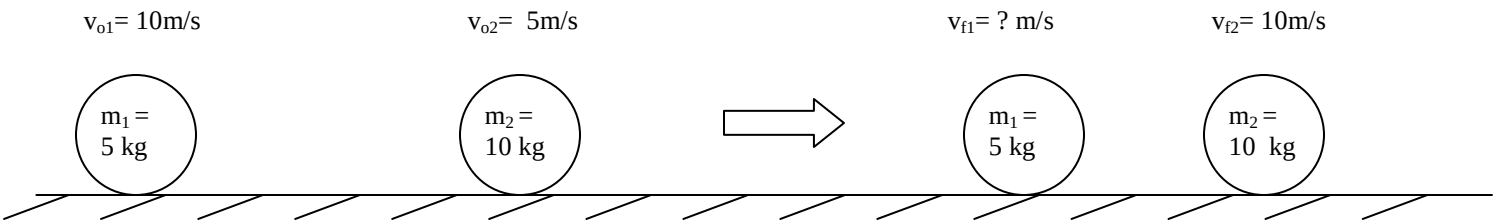


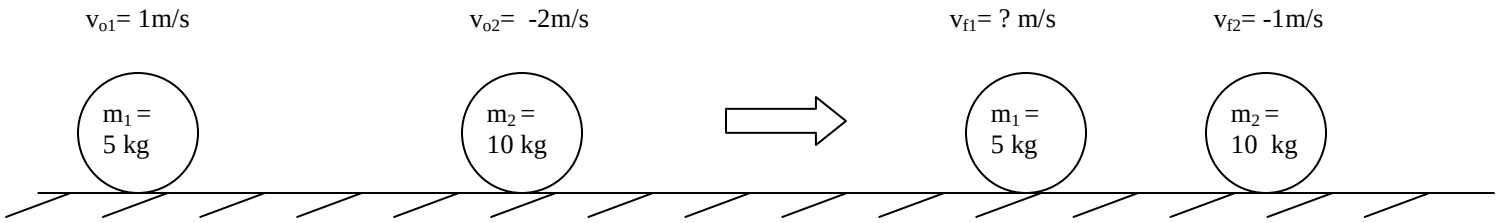


sticks

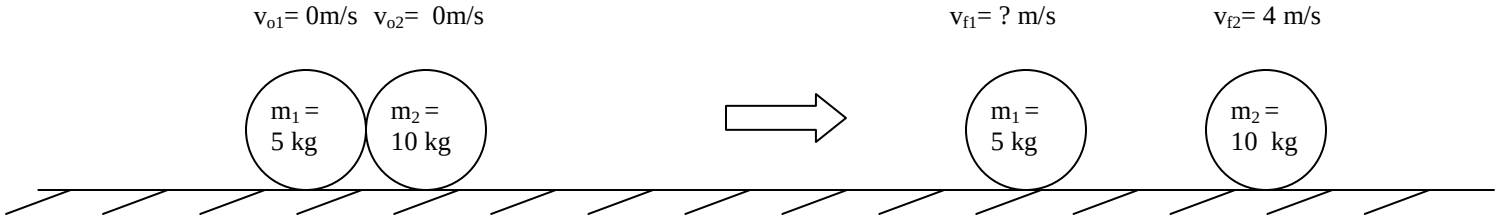


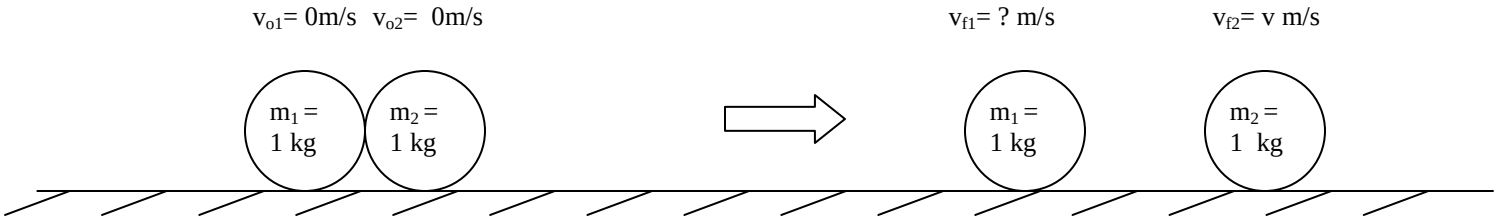


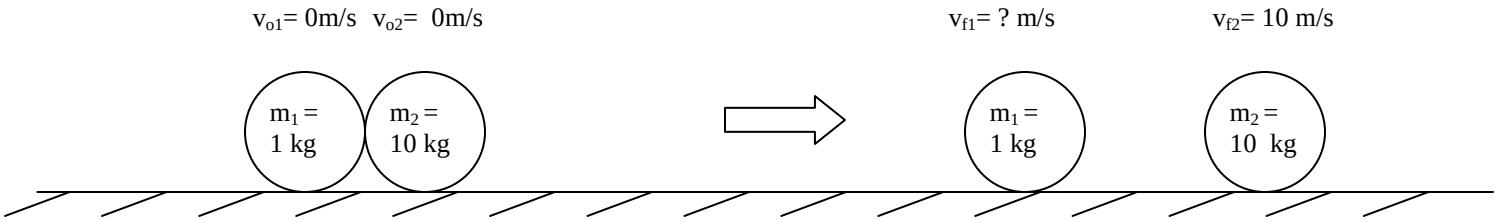

v_{o1}= 10m/s
v_{o2}= 5m/s
v_{f1}= ? m/s
v_{f2}= 10m/s
m_1 = 5 kg
m_2 = 10 kg
m_1 = 5 kg
m_2 = 10 kg

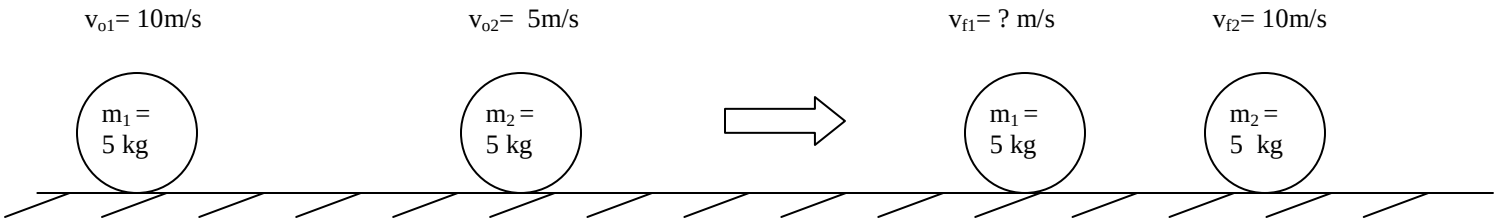

v_{o1}= 1m/s
v_{o2}= -2m/s
v_{f1}= ? m/s
v_{f2}= -1m/s
m_1 = 5 kg
m_2 = 10 kg
m_1 = 5 kg
m_2 = 10 kg

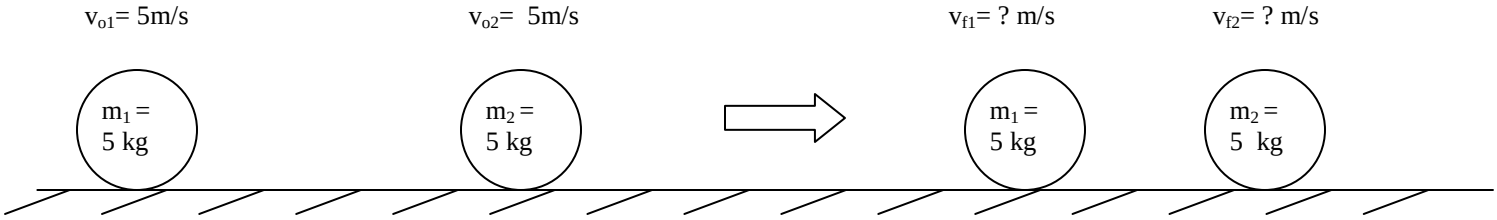
Explosions

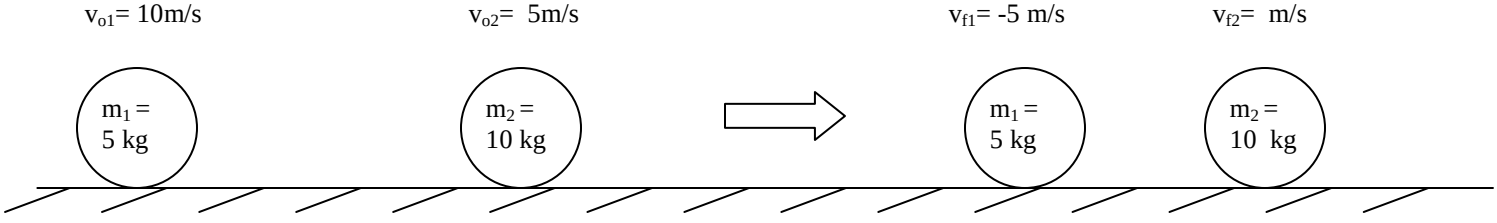

v_{o1}= 0m/s v_{o2}= 0m/s
v_{f1}= ? m/s
v_{f2}= 4 m/s
m_1 = 5 kg
m_2 = 10 kg
m_1 = 5 kg
m_2 = 10 kg


v_{o1}= 0m/s v_{o2}= 0m/s
v_{f1}= ? m/s
v_{f2}= v m/s
m_1 = 1 kg
m_2 = 1 kg
m_1 = 1 kg
m_2 = 1 kg


v_{o1}= 0m/s v_{o2}= 0m/s
v_{f1}= ? m/s
v_{f2}= 10 m/s
m_1 = 1 kg
m_2 = 10 kg
m_1 = 1 kg
m_2 = 10 kg


v_{o1}= 10m/s
v_{o2}= 5m/s
v_{f1}= ? m/s
v_{f2}= 10m/s
m_1 = 5 kg
m_2 = 5 kg
m_1 = 5 kg
m_2 = 5 kg


v_{o1}= 5m/s
v_{o2}= 5m/s
v_{f1}= ? m/s
v_{f2}= ? m/s
m_1 = 5 kg
m_2 = 5 kg
m_1 = 5 kg
m_2 = 5 kg


v_{o1}= 10m/s
v_{o2}= 5m/s
v_{f1}= -5 m/s
v_{f2}= m/s
m_1 = 5 kg
m_2 = 10 kg
m_1 = 5 kg
m_2 = 10 kg