

Conservation of Momentum (in 1D)

SPH4U

Newton's 3rd Law:

The Law of Conservation of Momentum: During an _____) _____ between two objects (where there is _____), the change in momentum of the first object is _____ but _____ to the change in momentum of the second.

Example: A rubber bullet R and a metal bullet M of equal mass strike a target with the same speed. The metal bullet comes to rest inside the target while the rubber bullet bounces back. Which exerts a greater impulse on the target?

Conservation of Momentum:

The Law of Conservation of Momentum (Version 2): During an interaction between two objects (where there is no external net force), the _____ momentum of the system _____ is equal to the _____ momentum of the system _____.

Example 1: A baseball of mass m leaves a pitching machine of mass M (where M includes the mass of the ball m) with a speed v . What is the recoil speed of the machine after shooting the baseball?

Example 2: A student of mass 75 kg is standing on a stationary raft of mass 55 kg. The student then moves toward one end of the raft at a speed of 2.3 m/s [N] relative to the water. Neglecting fluid friction, what is the velocity of the raft relative to the water?

More Practice: p. 243 #5, 6, 7
p. 245 #7

