

Physics

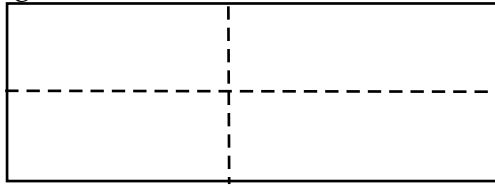
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Inv-7 Expan IIIB: Newton's 3rd Law vs. His 2nd and 1st and FBDs

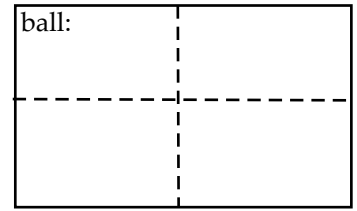
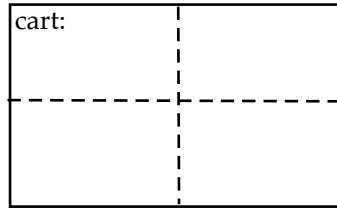
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1.) Video Demo 1: Tape Part II, #3 Cart/ Projected Ball Bearings

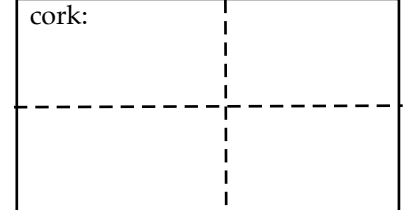
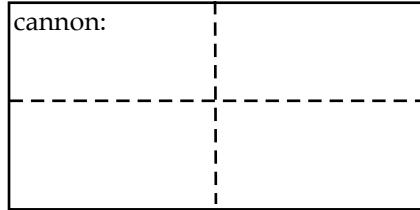
Assuming the cart and steel balls are one system. Draw a FBD of the moving cart/balls BEFORE the balls roll off:



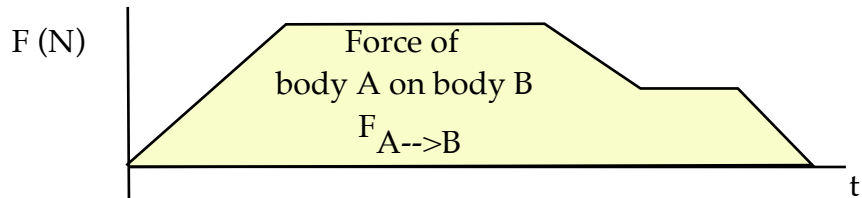
Now draw the two FBD's of the accelerating cart (body A) and a steel ball (body B) AFTER rolling off the cart.



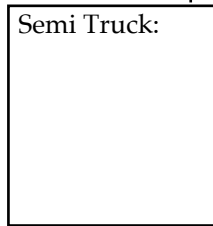
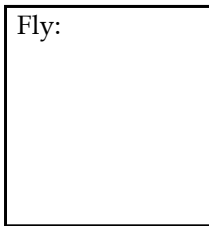
2.) Video Demo 2: Tape Part IV, #4 Liquid Nitrogen Cannon. Draw FBDs of the cannon and the cork as the cork is expelled.



3.) Complete the graph to illustrate Newton's 3rd law:

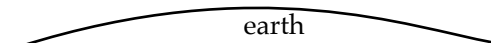


4.) Newton's 2nd Law vs. Newton's 3rd Law Fly vs. Semi Truck:



5.) Newton's 2nd Law vs. Newton's 3rd Law -- sky diver Where is the reaction force?

● sky diver



6.) Joe Dynamo is sitting on his massive sled (total mass 360 kg) on a large frozen lake. He has lassoed a hurt baby seal (mass of 40 kg) that is 15 meters away and is pulling it toward the sled with a constant force so he can doctor the seal's wounds. How far will the seal move? We are going to attack this problem using a new short cut strategy: Instead of doing a FBD, then $\Sigma F_x = ma_x$, then kinematics . . . we are going to learn a new short cut: it comes from the part of Newtons FIRST Law that says a system's center of mass (C.M.) can not move unless acted upon by an unbalanced external force. This requires a new formula: Center of Mass