

Momentum Mini Labs

Name: _____

For each of these mini labs, complete the task provided and show all work.

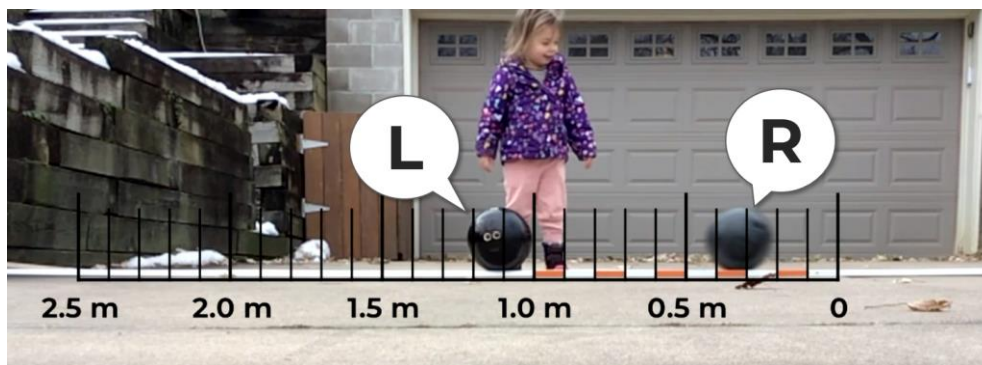
Equations and Constants

$v = d/t$	$PE_g = mgh$	$KE = \frac{1}{2}mv^2$	$p = mv$	$Impulse = F\Delta t = \Delta p$	$g = 9.81 \text{ m/s}^2$
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Part 1: Bowling Ball Collision – What's the Mass?

If there are no external forces causing an impulse on a system, we can assume that the total momentum of the system will be conserved. Use the overlay to measure and the included stopwatch on the slo mo video to measure a change in time in order to calculate velocity

Use the conservation of momentum to **calculate the mass of the bowling ball on the left** if the one on the right has a mass of 5.6 kg



[Click Here for Video](#)

Mass L	
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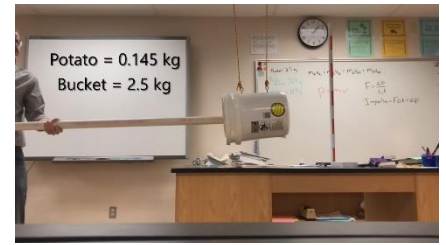
Mass R	5.6 kg
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Initial	
Velocity L	0 m/s
Velocity R	

Final	
Velocity L	
Velocity R	

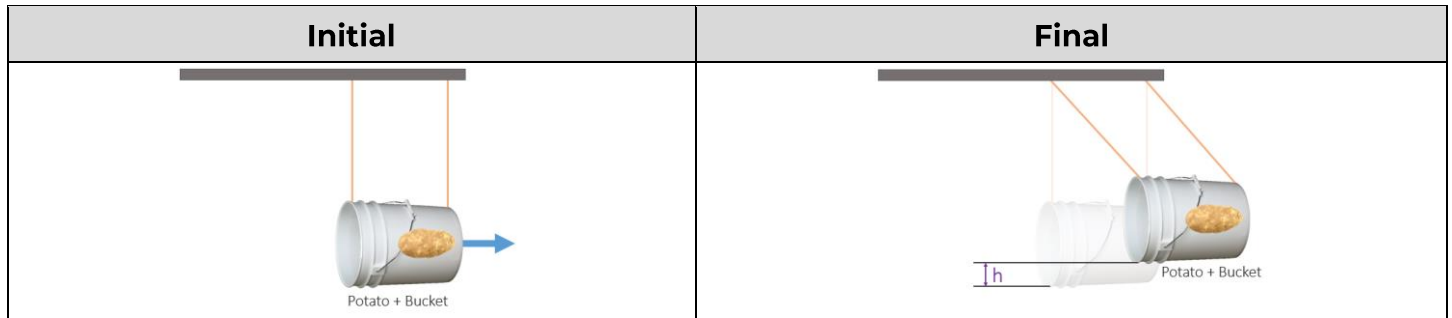
Part 2: Potato Gun Ballistic Pendulum – What's the Velocity?

A clever way to measure the velocity of a very fast projectile (like a potato out of a potato gun) is to fire it into a more massive pendulum and measure the highest point in the swing.



[Click Here for Video](#)

Step 1: Conservation of Energy



Use the conservation of energy and the maximum height of the bucket's swing to **calculate the top velocity of the bucket and potato** when it starts swinging after the collision.

Step 2: Conservation of Momentum



Use the conservation of momentum and the velocity of the potato/bucket system from part 1 to **calculate the initial velocity of the potato**

Potato Velocity	
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Step 3: Impulse and Momentum

Use the impulse and momentum with the potato velocity from part 2 and the time the potato was in the barrel to **calculate the force of the potato gun**

Potato Gun Force	
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