

First Name: _____

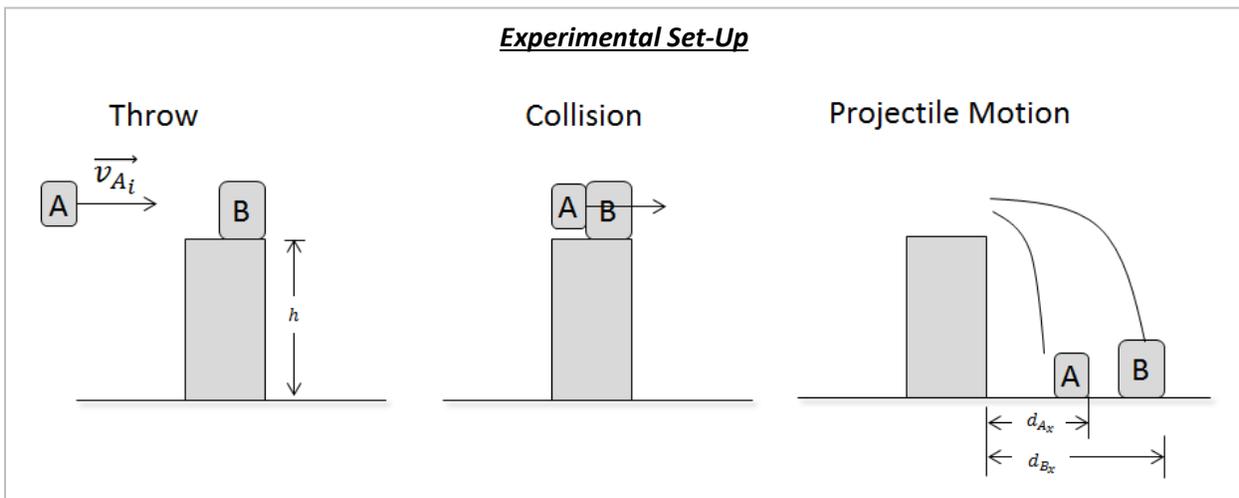
Last Name: _____

Physics 30 – Lab 1d – Initial Speed of a Throw

/10 marks

Students will :

1. Find two non-breakable items of light to moderate mass.
2. Collect “Pre-Throw Data” of *Object A*’s mass, *Object B*’s mass, and the height of a ledge.
3. Place *Object B* on the edge of the ledge, then throw *Object A* at it. Both items should land forward of the ledge. This may require several attempts.
4. Collect “Post-Throw Data” of *Object A*’s and *Object B*’s horizontal displacement.



Miscellaneous Student Notes:

Pre-Throw Data:

$m_A = \text{___ kg}$

$m_B = \text{___ kg}$

$h = \text{___ kg}$

Post-Throw Data:

$d_{Ax} = \text{___ m}$

$d_{Bx} = \text{___ m}$

Which Kinematics Equations will you use?

Students will then:

5. Use kinematics equations to determine the "flight time" of each object.
6. Use kinematics equations to determine the "launch velocity" of each object immediately after the collision as it starts its projectile motion.
7. Determine the momentum of each object immediately after the collision, labelled $\vec{p}_{A\text{final}}$ and $\vec{p}_{B\text{final}}$.

Calculations for Projectile Motion of Object A

Calculations for Projectile Motion of Object B

Calculations for Momentum of Objects after Collision

Projectile Motion Data:

$t_A = \quad \text{ s }$

$t_B = \quad \text{ s }$

$\vec{v}_{A\text{launch}} = \quad \text{ m/s }$

$\vec{v}_{B\text{launch}} = \quad \text{ m/s }$

Post-Collision Momentum Data:

$\vec{p}_{A\text{final}} = \quad \text{ kg*m/s }$

$\vec{p}_{B\text{final}} = \quad \text{ kg*m/s }$

Students will then:

8. Use conservation of momentum to determine the initial velocity of *Object A*.

Calculations for initial velocity of Object A

Pre-Collision Momentum Data:

$$\vec{p}_{A\text{initial}} = \text{_____ kg}\cdot\text{m/s} \quad \vec{v}_{A\text{initial}} = \text{_____ m/s}$$

$$\vec{p}_{B\text{initial}} = \text{_____ kg}\cdot\text{m/s} \quad \vec{v}_{B\text{initial}} = \text{_____ m/s}$$

Finally, students will:

9. Enter the following information into the Google Form on Google Classroom:
 - i. *Pre-Throw Data*
 - ii. *Post-Throw Data*
 - iii. *Projectile Motion Data*
 - iv. *Post-Collision Momentum Data*
 - v. *Pre-Collision Momentum Data*