Conservation of Mechanical Energy Lab

PURPOSE

The purpose of this lab is to observe the Gravitational Potential and Kinetic Energies in a falling body and verify that Mechanical Energy is conserved throughout the flight.

MATERIALS

ball
meter stick
stopwatch
triple beam balance

PROCEDURE

1. Find the mass of the ball using a triple beam balance.
2. Place the ball on a desk or lab table near the edge.
3. Measure ball's the distance above the floor.
4. Push the ball off of the table and time the ball's fall from the original height to the floor using the stopwatch.
4. Calculate the distance above the floor, speed, GPE, KE, and ME for each tenth of a second of the ball's flight using the formulas in the "Calculations" section of this lab sheet and complete the Data Table.
6. Answer the questions in the "Conclusion" section.

CALCULATIONS

Height above the floor: _____ m

$d = \text{Height above the floor} - \frac{1}{2} gt^2$

$v = gt$

$GPE = mgd$

$KE = \frac{1}{2} mv^2$

$ME = KE + GPE$

DATA TABLE

TIME (s)	DISTANCE (m)	VELOCITY (m/s)	GPE (J)	KE (J)	ME (J)
0		0		0	
0.1					
0.2					
0.3					
0.4					

CONCLUSION QUESTIONS

1. a. What happened to the GPE as the ball fell to the floor?

   b. Why did this happen?

2. a. What happened to the KE as the ball fell to the floor?

   b. Why did this happen?

3. a. What happened to the ME as the ball fell to the floor?

   b. What is the term used to describe what happened to the ME?

4. a. Using the GPE and KE, compare the flight of the ball to a roller coaster ride.

   b. What happens to the ME during a roller coaster ride?

5. a. The Data Table only goes until 0.4 s of the ball's flight. What would the PE be when the ball hit the floor?

   b. Describe what would happen to the KE right before the ball hit the floor?