

Name: _____

Date: _____

Conservation of Energy

Objective: To observe the relationship between the potential energy of a massed object that sets a cart system in motion.

Materials:

cart

hooked mass

slotted masses

string

stopwatch

bar masses

pulley with clamp

Procedure:

1. Clamp a pulley to the edge of the table.
2. Record the mass of the empty cart and the hooked mass and record.
3. Obtain a hooked mass and tie a piece of string to it. Ensure the string is long enough to drape over the pulley and have a few extra centimeters to attach to a cart. Mark the position in front of the cart with tape on the table top. This will mark the end of the cart's path.
4. Pull the cart backwards along the table top until the hooked mass is level with the table top. Mark this position on the table top with a piece of tape in front of the cart. This will mark the beginning of the cart's path.
5. Measure the height from the hooked mass to the floor and record. This should also be the distance of the cart's path.
6. Gently tap the cart and allow the hooked mass to fall to the ground. Try to make sure that it is moving at a constant speed. Simultaneously record the time it takes for the cart to travel the marked path. Do not allow the cart to crash into the pulley.
7. Average the times of three trials.
8. Repeat by adding slotted masses onto the hooked mass. Continue until four different masses have been performed.

Data:

Hooked mass = _____ g = _____ kg

Cart mass = _____ g = _____ kg

Distance from hooked mass to floor = _____ cm = _____ m

Slotted Mass (g)	Total Mass (g)	Time Trial 1 (s)	Time Trial 2 (s)	Time Trial 3 (s)	Average time (s)

Analysis:

1. Determine the potential energy of the mass system that falls to the ground.
2. Find the average velocity of the cart. This can be done by using distance over time.
3. Calculate the kinetic energy of the cart.
4. Find the percent error for each trial. The potential energy of the hooked mass system is the theoretical value and the kinetic energy of the cart is the experimental value.

Conclusion:

Was energy conserved? If not, do you think you have found a flaw in the law of conservation of energy, or are there alternative reasons?