

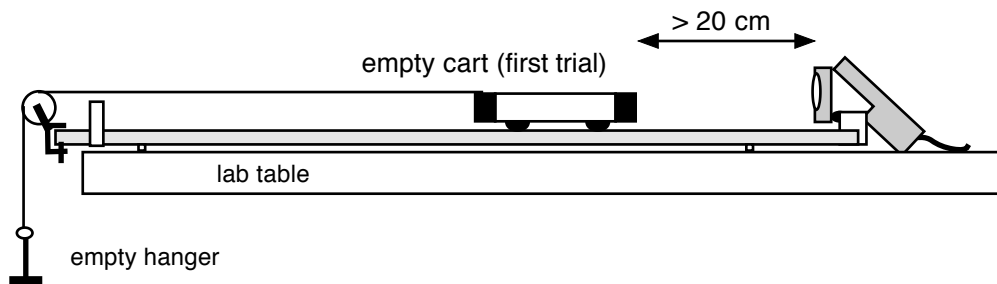
Lab 8-3: Conservation of Energy

Purpose: To examine the changes in potential, kinetic and total energy for a cart that is being pulled by a hanging mass.

Materials: 1 cart 1 pulley 1 track string 1 50 gram hanger

Procedure:

1. Set up the apparatus as diagrammed below.
2. Start Logger Pro and open up the file "02 Cart," as you usually do.



3. Hold the cart so that it is not moving and click on the blue "zero" button, which is next to the green "collect" button. Say ok to to zero the motion detector. You will then hear a couple clicks from the motion detector - this will be Logger Pro making the position of the motion detector equal to zero.
4. Click on the collect button, and then release the cart.
5. Using the "examine" tool, determine the speed and position of the cart before it hits the ground and record those numbers in the data table.
6. Add 50 grams to the hanger and repeat above. You will have to zero the motion detector again.
7. Remove the extra 50 grams from the hanger, but put a black bar in the cart, and repeat above.

Data:

	<i>Trial 1</i>	<i>Trial 2</i>	<i>Trial 3</i>
<i>Hanger Mass (kg)</i>	0.05 kg	0.10 kg	0.05 kg
<i>Mass of Cart (kg)</i>	0.50 kg	0.50 kg	1.00 kg
<i>Total Mass (kg)</i>			
<i>Initial Speed (m/s)</i>	0 m/s	0 m/s	0 m/s
<i>Distance Fallen (m)</i>			
<i>Final Speed (m/s)</i>			

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Calculations: For each of the questions below, show your work in the space provided and then write the answers in the table below. Make sure to include the equation you are using.

1. Determine the total kinetic energy of the mass and the hanger *before* you let them go.

$$K_i \text{ cart: } \underline{\hspace{2cm}} + K_i \text{ hanger: } \underline{\hspace{2cm}} = \text{Total } K_i: \underline{\hspace{2cm}}$$

2. Calculate the PE "lost" by the falling mass in each trial.

3. Calculate the total kinetic energy of the mass and the hanger *after* you let them go.

$$K_f \text{ cart: } \underline{\hspace{2cm}} + K_f \text{ hanger: } \underline{\hspace{2cm}} = \text{Total } K_f: \underline{\hspace{2cm}}$$

Summary of Calculations

	Trial 1	Trial 2	Trial 3
KE initial of cart and hanger (J)			
PE lost by hanger (J)			
KE final of cart and hanger (J)			

Conclusion:

1. Was energy conserved? Explain.

2. What would have happened if you used the friction blocks instead of the carts? Explain.

Both the cart and the hanger moved the same distance and they always the same speeds.

3. Which object lost potential energy? Explain.

4. Which object gained kinetic energy? Explain.