

**Honors Physics Lab**  
**Conservation of Energy: Elastic to Kinetic - Mr. Ward - 02-18-04**

\_\_\_\_\_  
 Name

\_\_\_\_\_  
 Period

**PROCEDURE:**

1. Start your computer and open Data Studio and the file on the floppy called "EnergyConservation".
2. Find the mass of the cart with either no, one, or two black mass(es) and RECORD.
3. Hang the spring from the clamp. Attach the 50 g hanger. RECORD the position of the bottom of the hanger when it is at rest.
4. Now hang 100 g on the hanger and again RECORD the position of the bottom of the hanger.
5. Attached one end of the spring to the cart and the other end to the string.
6. Pull the cart until the slack is out of the string. RECORD the position of the front of the cart.
7. Pull the cart back 10 cm. Click 'Start'. Wait a second and release the cart. Catch it after it passes equilibrium.
8. RECORD the maximum speed of the cart.
9. Repeat steps 7 and 8 for 20, 30, 40, and 50 cm.

**CALCULATIONS:**

13. Use Hooke's Law to find the spring constant. Show calculation. Use meters for distances and Newtons for force. RECORD k with correct units.
14. Calculate the spring potential energy for each trial and RECORD.
15. Calculate the maximum kinetic energy for each trial and RECORD.
16. Using the  $U_s$  as the theoretical value and K as the experimental, calculate % error. RECORD it.

**DATA TABLE for Energy Conservation**

mass of cart = \_\_\_\_\_ (kg)     $D_x$  spring = \_\_\_\_\_ (m)    F on spring = \_\_\_\_\_ (N)

Trial	$D_x$ (m)	$v_{max}$ (m/s)
1	0.100	
2	0.200	
3	0.300	
4	0.400	
5	0.500	

**RESULTS TABLE:**

k = \_\_\_\_\_ (N/m)

Trial	U spring (J)	K cart (J)	% error
1			
2			
3			
4			
5			

**What did you learn?**