# Lab 8-2: Energy in a Rubber Band

**Purpose:** To compare the work done by a rubber band on a clothespin to the work done by gravity after it is launched.

Materials:	2 stands with clamps	1 elastic band	1 clothespin
	1 mass hanger	one 50 gm mass	300 gms masses

#### **Diagram:**



### **Procedure:**

- 1. Set up the equipment as shown in the diagram, and record the mass of the clothespin.
- 2. Hang the empty 50 gram hanger on the elastic and record the amount that the elastic deflected down. Keep adding 50 grams to the hanger, recording the displacements each time.
- 3. NOW BE CAREFUL: Remove the hanger and all the masses, and place the clothes hanger on the elastic. Pull the clothespin down until the displacement in the elastic is equal to the displacement from when there was 400 grams hanging stretching the elastic.
- 4. Let the clothespin go and record how high above the elastic the clothespin travels.

#### Data:

Mass (kg)	Force (N)	Displacement (m)
0	0	0
0.05		
0.10		
0.15		
0.20		
0.25		
0.30		
0.35		
0.40		

**Calculations/Graph:** Using Logger Pro, make a graph of Force vs Displacement. You and your lab group need to figure out how to determine the work done on the clothes pin by the elastic band from this graph.

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### **Questions:** Show all your calculations!

1. How much work did the elastic band do on the clothespin once you released it? (You will need to use a graph in order to do this. Include the graph.) Describe how you calculated the work.

2. What was the total work done by gravity from the time you released the clothespin to its maximum height? Show your calculations.

3. In a typical ideal physics problem, the answers to numbers 1 and 2 would be the same. You probably found something fairly different. Why? What happened to the energy?

4. What could you have done to ensure a smoother transfer of energy?