PS 12A

Names:
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Lab Time:

Lab 5: Bungee Jump

Part I: Set-up the Problem

The purpose of this lab is to have drop a mass from a spring connected to a spring and have it come as close to the floor as possible. The spring is connected to the same place as the where the jumper starts from. We will try two different springs.

Draw a labeled diagram of the situation: (Use H=total height, L= Length of the unstretched spring, X = distance the spring has stretched)

Part II: Solve the above problem algebraically for the height of the jumper.
(Hint: It's a quadratic) Show your work.

Part III: Solve the problem experimentally. Find the force on the spring as a function of distance stretched.

A.) Use the force sensor attached to logger pro to measure any forces applied to the spring. Don't forget to zero the sensor. Use the appropriate scale setting (10N for the light Spring, 50N for the Rubber Band)

B.) Move the platform to its maximum height and take measurements all the way to the floor.

C.) Make a chart of force applied and the distance the spring has been stretched.

D.) Do not assume the spring obeys Hooke's law.

E.) For fun try stretching the spring at different rates. Pulling slowly vs. pulling fast. What might be the difference?

Part IV: Graph your solutions. Create a plot of the work done by gravity vs. X, and an elastic potential energy vs. X graph. Make sure to label the axis and give it a title. Take a screenshot of your graph and print it. Attach it to the end.

Part V: Find the jump height from the graphs above. Call over a TF to help adjust the platform height and to watch the jump. Use a camera to film how close it comes to the floor. Don't forget to include a meter stick in the shot near the floor.

Jump height from graphs = _____ meters

Height above the floor = _____ cm

Part IV: Try one of the less linear springs like the bicycle tubing or connected rubber bands. You might try to automate the Force vs. Distance stretched graph by including a motion sensor. Again, don't forget to zero the sensors.

Conclusion: Explain any factors that may have contributed to the success or failure of the jump.