PHYSICS 2204
Unit 3: Work Power and Energy
Core Lab #1: Elastic Potential Energy

STUDENT NAME:_____

DATE:_____

GROUP MEMBERS:

_____ _____

PURPOSE: In this experiment you will determine the amount of elastic potential energy stored in a spring.

BACKGROUND:

You should recall from a previous lab exercise, that the force per unit of length needed to stretch a spring is referred to as the Spring Constant and the principle of Physics that describes the behavior of springs is called Hooke's Law. If a force causes an object to move in the same direction as the force, then work is done. Work requires a change in potential energy. The "elastic potential energy" stored in a spring is related to the spring constant but is not the same thing.

PROCEDURE:

Part A: Making a Force Versus Mass Graph

1. Open a browser and go to:

https://phet.colorado.edu/sims/html/masses-and-springs/latest/masses-and-springs_en.html

This link is also found on my website: www.mrfifieldcorner.weebly.com

2. In the simulation click displacement, and mass equilibrium.

3. Set Spring Constant 1 to Small

4. Set damping to "lots" to prevent the spring from oscillating

5. Drag the ruler on the simulation to measure the elongation of the spring

6. Measure the length of the spring with 0 added mass. Record this length in the data table.

7. Hang a mass of 50 g on the spring. Calculate and record the force (weight) of the mass.

8. Measure and record the distance the spring is stretched (the change in length).

9. Repeat for 100g, 150g, 200g 250g and 300g

10. Complete table 1

11 Graph your force-elongation data. (Force should go on the vertical axis, elongation on the horizontal.)

Caution:

1. Converts masses from grams to kilograms
2. Lengths must be converted from centimeters to meters.
3. You must use the distance the spring is stretched (the change in length) not the entire length. Please use the ruler on the simulation to complete this

DATA/ CALCULATIONS:

Added Mass (kg)	Weight(N)	Stretch of Spring(m)
0	0	0
0.050		
0.100		
0.150		
0.200		
0.250		
0.300		

A. Calculate the slope of the graph:

B. What does the slope represent?

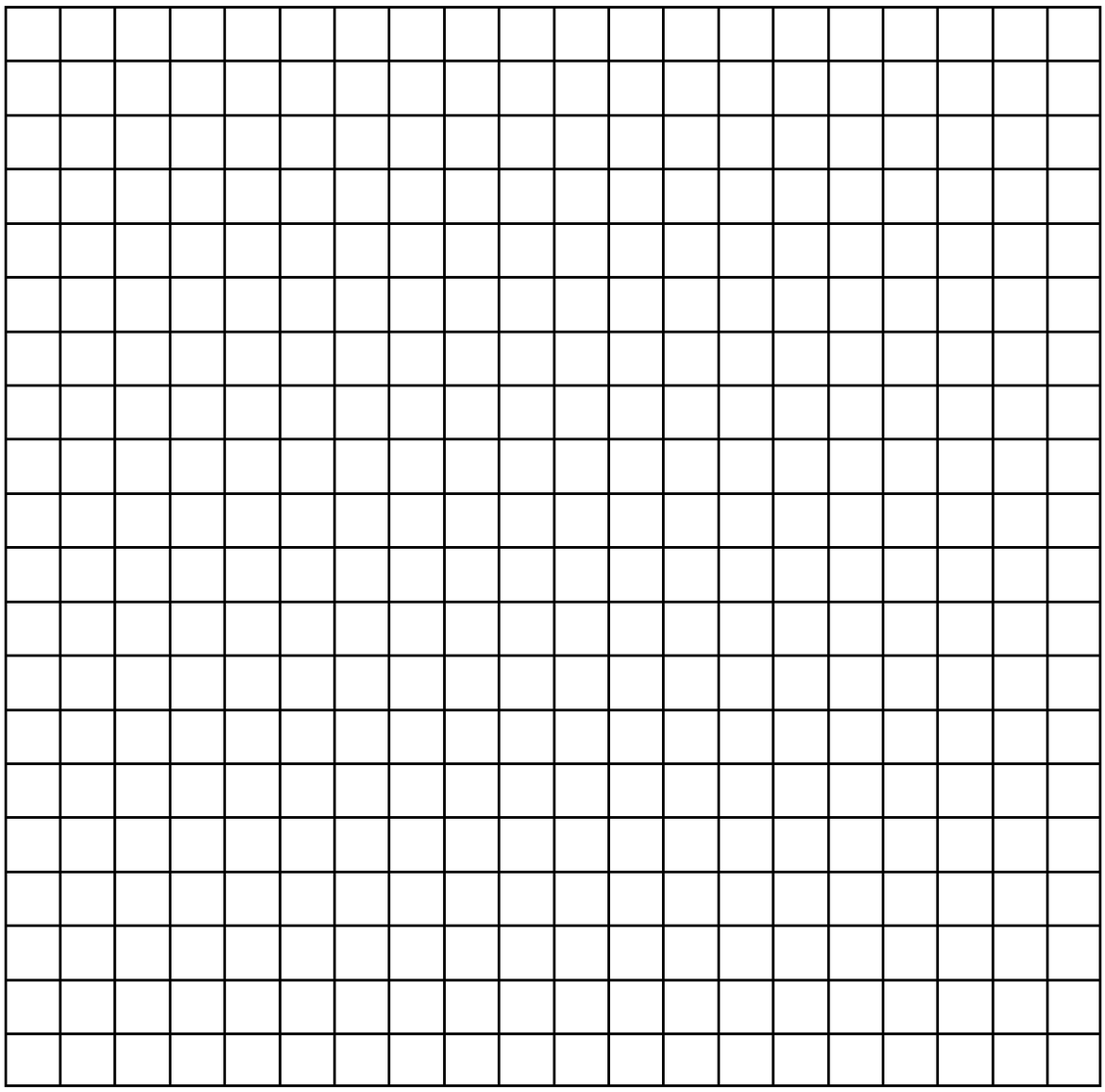
C. What would the area under the graph represent?

Part B: Create A Elastic Potential Energy Versus Elongation Graph

Use the Force versus Elongation graph from part A to complete the table below:

Elongation (m)	**Elastic Potential Energy (J)**
0	0

Graph your Elastic Potential Energy Versus Elongation data. (Elastic Poential energy should go on the vertical axis, elongation on the horizontal



How would you describe the shape of the graph?

Would you describe the relationship being linear or quadratic?

Conclusion: