Name:

Springs Lab

**OBJECTIVE**

The purpose of this lab is to verify the relationship between the force applied to a spring and the resulting elongation of the spring. This relationship which is known as Hooke's law is F = kx. Where k is the spring constant and is a measure of the stiffness of the spring.

**DESCRIPTION**

A mass of known value is hung from a spring. The elongation of the spring is then measured. The weight of the hanging mass supplies the force that stretches the spring.

***DO NOT HANG MORE THAN 0.25 KG FROM ANY SPRING. HANGING A GREATER MASS MAY CAUSE THE ELASTIC LIMIT OF THE SPRING TO BE SURPASSED.***



**PROCEDURE**

Adjust the height of the scale so that the pointer on the bottom of the pan points at 0 on the scale when there is no load on the pan. This may be accomplished by squeezing the scale braces together and raising or lowering the scale as needed. Once the scale is zeroed, place a 0.05 kg (50g) mass on the pan that is suspended from the spring. Measure the elongation of the spring in meters. Increase the mass on the pan in increments of 0.05 kg to a maximum of 0.25 kg (250g) and record each elongation. Do not place more than 0.25 kg on the pan. Repeat this procedure using two other types of spring.

**CALCULATIONS**

1. Calculate the weight of the each of the masses placed in the pan and enter the value obtained in the column marked load on pan.

2. Calculate and record the spring constant for each elongation. Determine the average spring constant for each spring.

3. The equation used to calculate the work done (elastic PE) in stretching a spring is  Determine the work (W = PEs) done on the springs when each of the masses is hung from it. Use the average k value in calculating work.

**DATA ANALYSIS**

Plot a graph of Load (Force) vs. Elongation, with a trendline for each spring.

Plot a graph of Elastic Potential Energy vs. Elongation, with a trendline for each spring.

**CONCLUSION**

1. What is the physical significance of the slope of the Force vs. Elongation graph? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What force does the work on the spring? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What happens to the energy associated with the work done on the spring? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_