Physics 02-04 Spring Constants Lab ***Name:*** _____

Adapted from Take-Home Physics by Michael Horton

Objectives

- Find the relationship between stretching and force.

Materials

- Rubber band
- Ruler
- 6 Large washers
- Paperclip
- Device capable of doing regressions (Vernier Graphical App or graphing calculator)

Procedure

1. Use a digital scale find the mass of all 6 washers. Divide by 6 to get the average mass of one washer. **0.005** _____kg
2. Hang the rubber band from a paperclip and attach a bent paperclip to the other end of the rubber band so that it can hold the washers.
3. Hang one washer on the paperclip and measure the rubber band's length.
4. Hang two washers and measure the rubber band's length.
5. Finish filling out the table. (Remember $W = mg$.)
6. Create a graph to find the relationship between the weight and length. Put the length on the x-axis and the weight on the y-axis.
7. The points should be an approximate straight line. Use a device to find the equation of the best-fitting line. Since length is on the x-axis and weight (force) is on the y-axis, use x for the x-variable and F for the y-variable. **F = 26x** _____
8. Since the graph is a straight line, the slope is constant. What are the units of the slope? **N/m**
9. The slope is called the spring constant and is a measure of the stiffness of a spring. What is the spring constant of your rubber band? **26**
10. Use your best-fitting line equation to find the length the rubber band would be with 10 washers. _____
11. Is there a limit to how many washers you could hang before the pattern in the graph changes? Do a mini-experiment to check your answer. **Yes, the spring stiffens and then breaks.**

Washers	Mass (kg)	Weight (N)	Length (m)
1			
2			
3			
4			
5			
6