Hooke's Law Lab

Name:_____

PSI Physics

An Experiment to investigate Hooke's Law

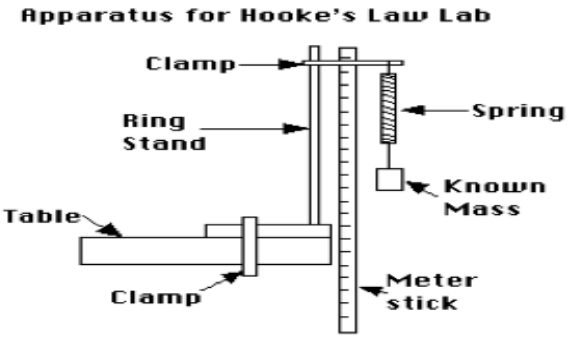
Objectives:

During this lab, you will establish Hooke's Law and will find the value for the spring constant for two springs.

Hooke's Law explains the relationship between the force exerted on a spring, the stretch of the string, and the spring constant of the spring. Springs are very special because they have a restoring force, which means that when a force is applied on them, they exert an opposing force to restore their original shape.

Materials:

- Ring Stand
- Clamps
- Ruler
- Springs
- Set of masses



Procedure:

For each of two springs:

1. Attach the spring to the ring stand and have on of your group members hold the 0 mark of a ruler up to end of the spring (usually a hook or a loop).

For each of 5 masses:

2. Attach the mass to the end of the spring, measure the stretch of the spring by looking at the location of the end of the spring, and record this measurement in the provided table. (Warning: two much weight on a spring can permanently damage it. Only add a little weight at a time!)

Data Collection:

Spring 1:

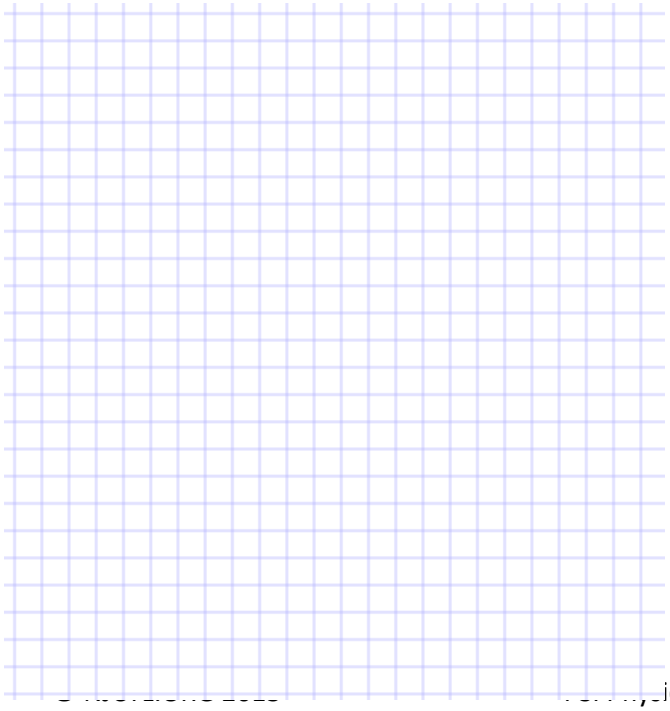
Mass (Kg)	Weight (N)	Stretch (m)

Spring 2:

Mass (Kg)	Weight (N)	Stretch (m)

Data Analysis: For each spring:

1. Plot the applied force, F (N), (this is the total weight, m•g, of the masses, m, hanging on the spring) on the y-axis versus the corresponding stretches, x (m), on the x-axis.



2. Draw a best-fit line for each of your plots. Be sure to include (0,0)

3. Do thesw best-fit lines approximate your data well? Yes or No

   If so, then you've established Hooke's Law F = kx

4. Use the slope of the graph to find the spring constant.

(a) Spring 1: $k = F/x$

(b) Spring 2: $k = F/x$

Application:

5. Use the value of k that you found for spring 1 to predict the stretch of spring 1 for two masses that you did not use in your measurements.

6. The end of a spring stretches 0.02 m when a 100 g mass is added to it. How much will the spring stretch when a 500 g mass is placed on it?

7. A spring has a spring constant of 100 N/m. What would be the stretch of the spring a force of 4 N is applied to it?