Experiment 2: Determination of the Spring Constant (Hooke's Law)

Purpose

This experiment is performed to determine the spring constant with mass-spring system.

References

1. Physics Laboratory Experiments, Yuksel Sahan, Zambak Publications.
2. Physical Science Lab Manual, Pearson Education, Inc., publishing as Pearson Prentice Hall.

Safety First

Do not overload the spring. This causes deformation.

Equipments

1. Spring with hook
2. Hanger
3. Rod
4. Ruler
5. Adjustable slotted masses

Pre-Lab Questions

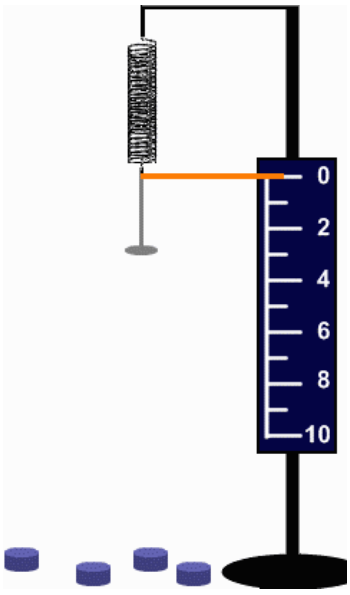
1. What differs one spring from another?
2. Does a spring produce the same amount of force when it is compressed or decompressed for equal distances?

Introduction and Theory

Hooke's Law states that the **restoring force** of a spring is directly proportional to a small displacement in the spring. In equation form, we write

$$F = -kx$$

where x is the amount of the displacement. The **k** is proportionality constant (spring constant) and it has a specific value for each spring.



Experimental Procedure

The equilibrium can be expressed as F = kx where F = W, where W is the weight of the added mass. Weight is mass times the acceleration of gravity or W = mg where g is about 9.81 m/s^2. Using this relationship weights are computed for the masses in the table above.

Data Collection and Calculations

	m (kg)	F (N)	X (mm)	X (m)	k (N/m)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Then determine $k_{AVERAGE}$.
From the above data, the below graph is plotted and determine the k value from it. Compare this value with that obtained from the table.

Your Conclusion