1. How is the magnitude of the applied force and the spring force (restoring force) related?

= both magnitudes are equal

2. Do the applied force and spring force act along the same direction?

= No.

3. Does a higher value of k result in a stiffer/less stretchy spring, or a less stiff/more stretchy spring?

= stiffer/less stretchy spring

4. How is the displacement and applied force related?

= Occur in the same direction, proportional to applied force.

5. How does the proportionality region change in the Hooke’s law graph with respect to increase in spring constant, k?

=slope is getting closer to applied force as K is increasing

Theory

In 1678 English Physicist Robert Hooke established that most solids behave with elastic properties; even very "inelastic" materials like steel will behave elastically under large loads. Here the elastic property indicates that a material goes back to its original shape and size when the force causing deformation is removed.

The deformation is proportional to the force applied within the elastic limit. In short he resolved that

Fs = -kx

where:

**Fs is a "spring force"** or "restoring force" (as the spring tries to return to its original or unloaded form) (Units: N)

k is the "constant of elasticity" or basically a number that describes how elastic or stretchy a material is. (units: N/m)

**x is the elongation or the deformation of the spring**.

Basically the difference in length of the spring when stretched from its unstretched length. (Units: m)

The negative sign indicates that the Spring Force is in the direction opposite that of the displacement (elongation).

Purpose

Measuring extension and force using a program.

Recording and explaining data for springs using Hooke’s law.