Springs Set

P3-3605

BACKGROUND:

For verification of Hooke's Law, this set of 5 springs with different spring constants is extremely helpful!

INSTRUCTIONS:

The pre-stress has been removed to give accurate results. Compare the elasticity of each spring as it stretches 2cm with a load of .05N, .1N, .2N, .3N and .5N respectively. Just mount a rod to any stand and the springs easily are held in place using a built in ring. At the other end of each spring is a hook for attaching weight along with an easy-to-read adjustable position indicator.

EXPLANATION:

The relationship known as Hooke's Law states that for common mechanical springs, small changes in length occur as forces are applied to them. This relationship is named after the 17th century British scientist Robert Hooke (who also coined the phrase “cell” after viewing cork cells under a microscope) where he stated that the amount by which a spring is elongated or compressed (the strain) is directly related to the force causing the stretching or compressing (the stress). Most common springs exhibit this behavior unlike other elastic substances such as rubber bands or bungee cords where the relationship is not linear and dependent on temperature as well.

The relationship can be modeled ideally with this five spring set. As a simple graphing activity for the middle school student, each student team can be given a set of 5 springs or move through stations where each different type of spring is tested, the students can place various masses on the springs, collect data and graph Force vs. Elongation. While performing this experiment with conventional springs, students tend to confuse where measurements are read, resulting in inconsistency in their collected data. These springs are manufactured with a red indicator/pointer to use as a clear measuring point for determining the elongation.

Using this set-up with Physics students (...a required lab in most Physics laboratories), the students’ results will be far more accurate when analyzing the graphs produced through the Hooke’s Law experiment. Using the 5 different springs in this set, each spring has its own Spring Constant, a measure of the "stiffness" or "strength" of a spring. The generation of 5 different graphs will result for student analysis. The Potential Energy produced by stretching the springs can also be computed by finding the area under the plotted graphs. With this durable, accurate and repeatable spring set, “guesswork” is not part of the equation during one of your more important labs during the year