liquid. Remember, an object will float if it is less dense than the liquid it is placed in.

IGCSE Physics [Syllabus 1.5] Forces

We are going to conduct a simple experiment that demonstrates the effect of gravitational force on a spring. To begin, we will hang the spring on a platform and place a ruler alongside it in order to measure the different lengths of the spring as we add various masses at its end. When we add mass, it creates a downward force on the spring, causing it to extend. This is due to gravity, which is a force that acts on mass. Our experiment is to plot the extension caused by each mass on a table. At each step, we will measure the extension caused by adding a specific mass. The larger the mass added, the greater the weight and hence the greater the extension on the spring. For example, when we added 100 grams, the spring extended by one centimeter. When we added an additional 100 grams to make it a total of 200 grams, the extension was two centimeters.

According to Hooke's Law, when we add 100 grams to a spring, it extends one centimeter, showing proportionality. However, after 400 grams, things do not seem so proportional anymore. For instance, from 500 to 600 grams, you would expect the extension to be six centimeters, but you actually get seven. Furthermore, between 600 to 700 grams, the extension increases by a huge margin of 5 centimeters. At this point, the spring may start to damage as the force is not proportional to the extension anymore. Once you pass the elastic limit, you cannot undo the damages even after unloading the weights. A typical representation of a force-extension graph shows force on the y-axis and extension on the x-axis. Hooke's law suggests that extension is proportional to the applied force until the limit of proportionality is reached, and almost every spring behaves this way for a good part of its behavior.

The force constant (k) is equal to the force (F) divided by the extension (x). When calculating the gradient of the straight line part of a force-extension graph, you are actually calculating the force constant for that particular spring. The constant will be in Newton per centimeter, but here we use centimeters as units. If a spring is stretched beyond its elastic limit, it will no longer return to its original position and will remain permanently malformed. However, as long as the weight is removed, the spring will return to normal. Once the elastic