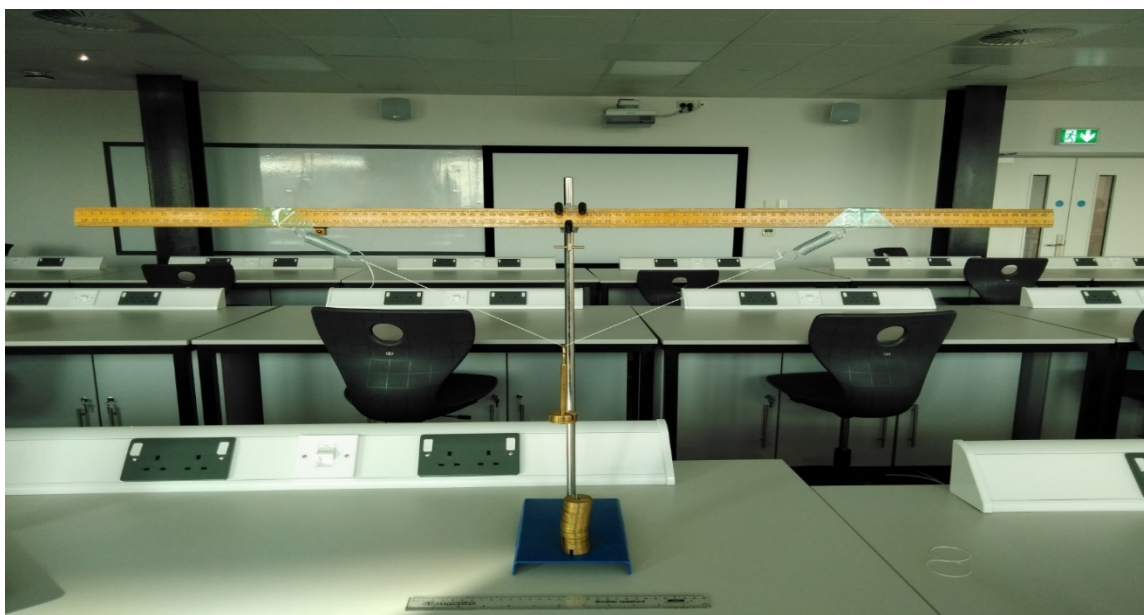


Report for Science practical:

The reason I performed this experiment was to investigate what happens when weight is added to the apparatus and to see if the chosen spring obeyed Hooke's law, I looked at the length of the spring the string and also the change in angle, adding weight and measuring is how we determined our answers. With these measurements I was able to determine whether the spring obeyed Hooke's law.

The set up used a clamp, stand, 2 springs, 1m ruler, string, protractor, weights in 50 grams and a measuring ruler.



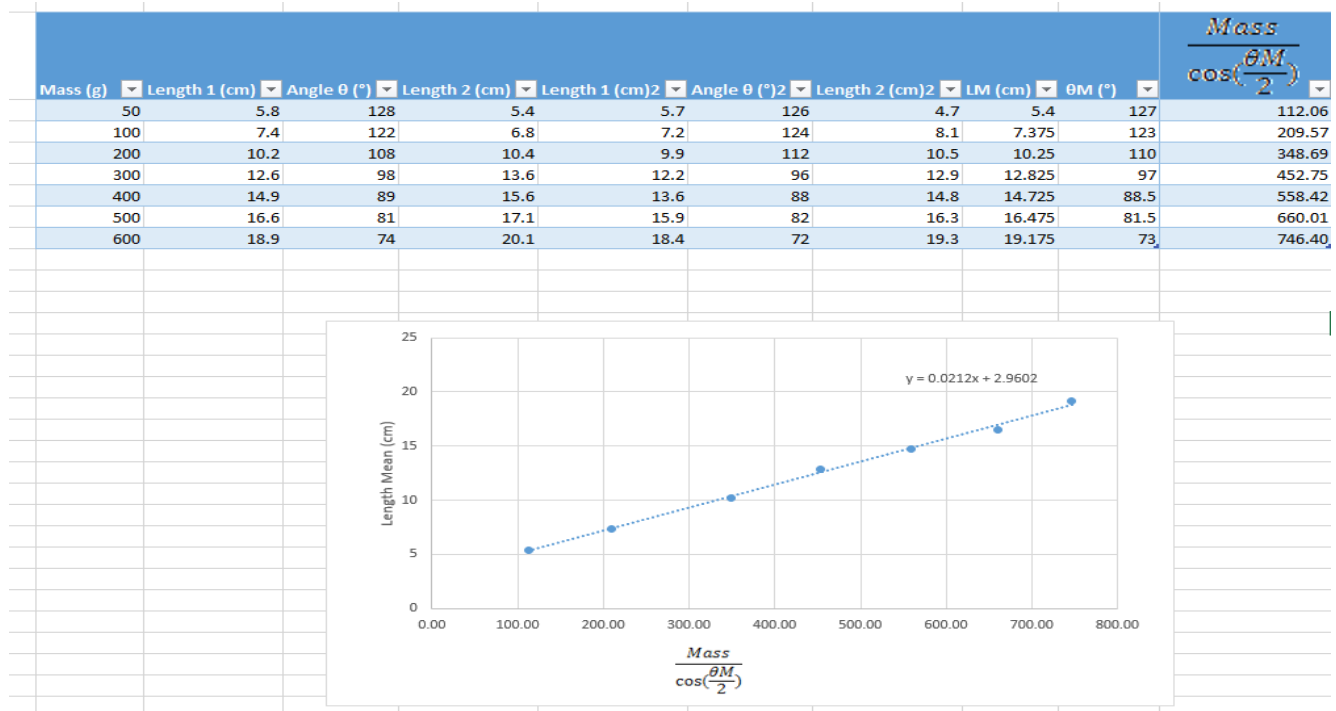
It was set up the same as the above photo.

The method that I used was firstly to create a results table to note all of the answers gained, this would include the lengths of either side of the string, and also the angle, and I duplicated this table as I repeated the experiment twice for more reliable results. At the end of the table I had a mean for length and a mean angle, and also the equation needed for the graph. Once you have created your table add a mass increasing by 100g each time and measure the length of the string and the angle of between each part of the string. I did this up until 600g and repeated this to gain reliable results. Once completed calculate the mean length and the mean angle using both results gained, once you have calculated the mean use it in the equation on the table below, this will then allow myself to draw a graph of best fit to view if the spring obeys Hooke's law. I found it easier to add all of my results into excel as editing data is easier in that program.

The table I drew will be below which includes the equation needed to create the graph.

Mass (kg)	Readings 1 (cm)			Readings 2 (cm)			Derived data		
	L1 (cm)	θ (°)	L2	L1	θ (°)	L2	LM (cm)	θ (°)	
0									
0.1									
0.2									
0.3									
0.4									
0.5									
0.6									

Below you will also see the layout of my spreadsheet that I constructed for this experiment.



For the results you must calculate the mean for the angles and the lengths you gathered. This will give you LM and θM , you will then input these into your table as seen above. You can then use the equation $\frac{Mass}{\cos(\frac{\theta M}{2})}$ shown in the last coulomb of the table to calculate the mean mass acting downwards. This will then allow you to create a graph like I have in excel. This will the help you draw conclusions. To reduce uncertainty I also allowed time for the masses to stop moving, this will furthermore increase the reliability of the results gained. The graph I recommend drawing is also a line of best fit as it will give the most accurate line.

Here is the percentage uncertainty of each mean reading that has been taken. This will help the experimenter improve the accuracy of their results as they are aware of the difference between their answer and the real figure.

mass uncertainty ▼	length uncertainty ▼	Angle uncertainty ▼
2.00	18.52	0.79
1.00	13.56	0.81
0.50	9.76	0.91
0.33	7.80	1.03
0.25	6.79	1.13
0.20	6.07	1.23
0.17	5.22	1.37

To conclude with my graph that I formed it turned out to be a straight line which shows a trend that as the mass increased the length increased a similar amount. This is a pattern that shows that the increase in mass is proportional to the increase in length due to the straight line formed. Also when calculated $y=mx+c$ it came out to be $y = 0.0212x + 2.9602$. There are very few parts along the line of best fit where there are higher points than the line and lower points. This I believe could be down to inaccuracy and systematic errors when performing the experiment which has led to these minor increases.