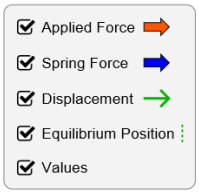
Hooke's Law – PhET SIM

Goto: https://phet.colorado.edu/sims/html/hookes-law/latest/hookes-law_en.html

Start by clicking 

and checking all of the boxes 

Leave the other settings as they are.

Apply a stretching force (to the right). Compare the displacement and the applied force. How are they related?

Now apply a compressive force. Compare the displacement and the applied force. How are they related?

What does 'equilibrium position' mean?

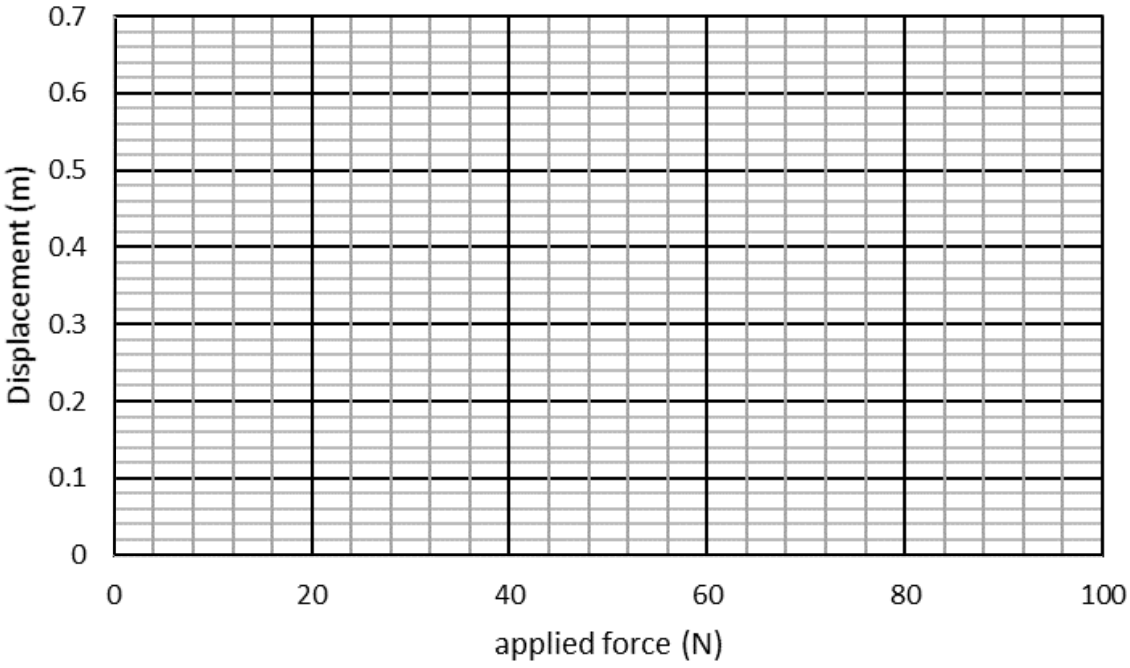
Apply a stretching force of +100N. Now adjust the spring constant. How does the value of spring constant affect the displacement?

Set the value of the spring constant to 200N/m, and record the following:

Applied force (N)	Displacement (m)
0	
10	
20	
30	
40	
50	
60	
70	
80	
90	
100	

Looking at the data in the table, describe the relationship between applied force and displacement.

Now you will plot a graph of displacement against applied force:



Make sure that you fit your data with a line of best fit.

Now sketch a line on the graph you would expect to get if the spring constant was bigger. (You might need to check this by adjusting the spring constant slider.)

Now sketch a line on the graph you would expect to get if the spring constant was smaller. (Again, you can check this).

Work out the gradient of your line of best fit on your graph. What units is gradient in?

Gradient = _____ _____

How is the gradient related to the spring constant? (You might like to check this mathematically)

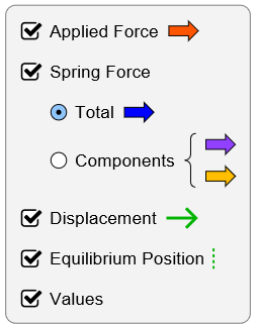
Combining springs

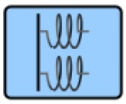
We are now going to have a go combining springs in series and parallel.

How do you think combining 2 springs in parallel (side by side) will compare to one spring on its own?

Now choose 

and check these boxes.



Choose springs  in parallel.

Keep the spring constants at 200N/m.

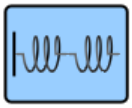
Change the applied force and observe the displacement.

How does the displacement compare to that you got for one spring?

Estimate the combined spring constant.

Combined spring constant = _____ N/m

How do you think adding springs in series (one after the other) will compare to one spring on its own?

Choose  springs in series.

Keep the spring constants at 200N/m

Change the applied force and observe the displacement.

How does the displacement compare to that you got for one spring?

Estimate the combined spring constant.

Combined spring constant = _____ N/m