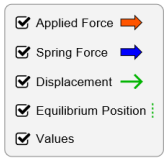
5.3.1 Hooke's Law – PhET SIM

Goto: https://tinyurl.com/bdzy69yy

videos

Start by clicking 

and checking all 

of the boxes.

Leave the other settings as they are.

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

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

(3) What does 'equilibrium position' mean?

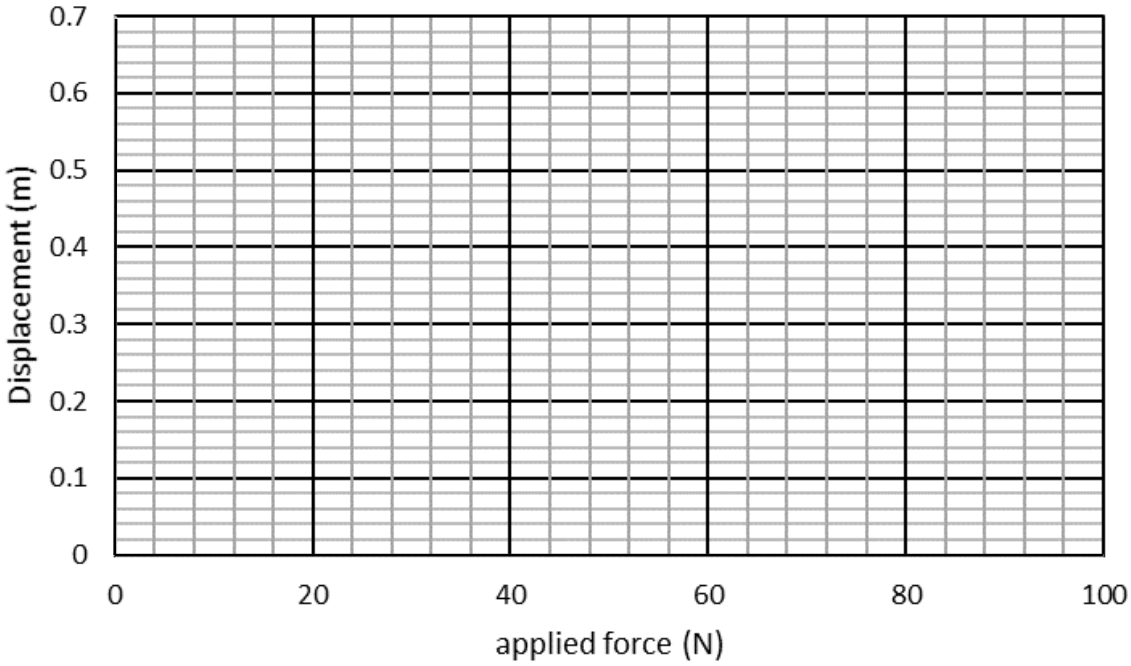
(4) Apply a stretching force of +100N. Now adjust the spring constant. How does the value of spring constant affect the displacement?

(5) 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	

(6)✎Looking at the data in the table, describe the relationship between applied force and displacement.

(7)✎Now you will plot a graph of displacement against applied force:



(8)✎Make sure that you fit your data with a line of best fit.

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

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

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

Gradient = _____ _____

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

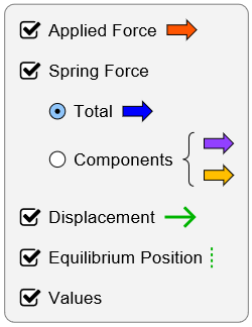
Combining springs

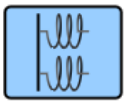
We are now going to have a go combining springs in series and parallel.

(13) 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.

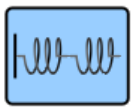
Change the applied force and observe the displacement.

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

(15) Estimate the combined spring constant.

Combined spring constant = _____ N/m

(16) How do you think adding springs in series (one after the other) will compare to one

Choose springs  in series.

Keep the spring constants at 200N/m

Change the applied force and observe the displacement.

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

(18) Estimate the combined spring constant.

Combined spring constant = _____N/m