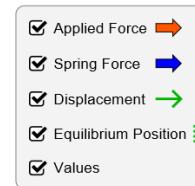



5.3.1 Hooke's Law – PhET SIM


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.

(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?

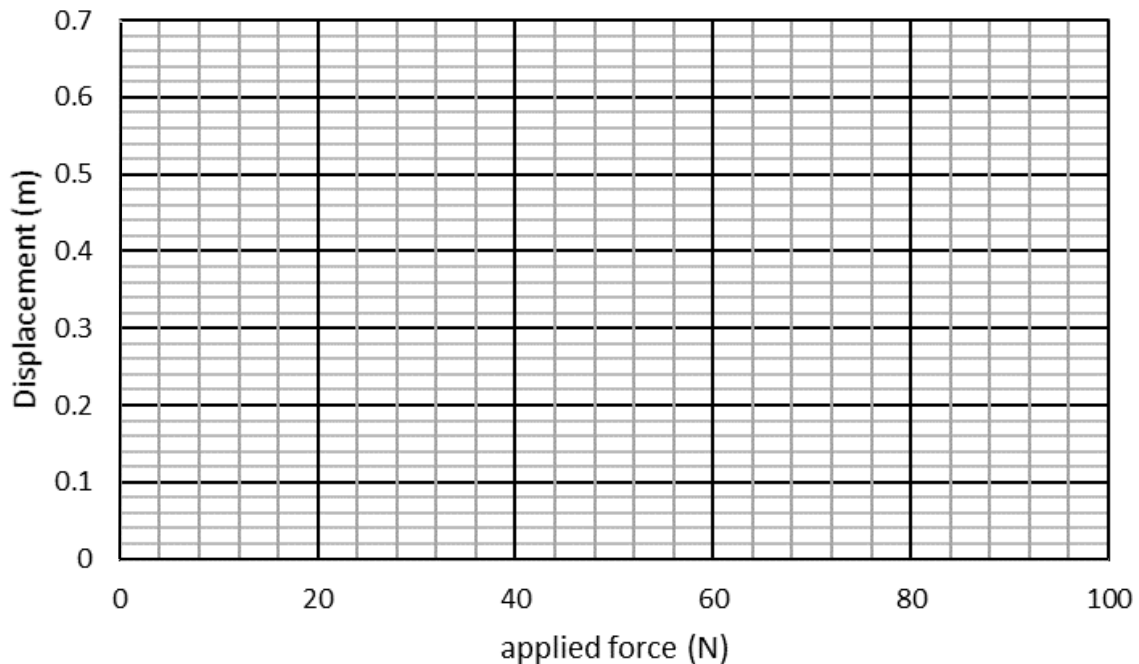
(4)  Apply a stretching force of +100N. Now adjust the spring constant. How does the value of spring constant affect the displacement?

(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.

Applied Force

 Spring Force

 Total

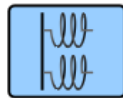
 Components }

 Displacement

 Equilibrium Position ⋮

 Values

Choose springs



in parallel.

Keep the spring constants at 200N/m.

Change the applied force and observe the displacement.

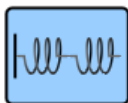
(14) *How does the displacement compare to that you got for one spring?*

(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 spring on its own?*

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