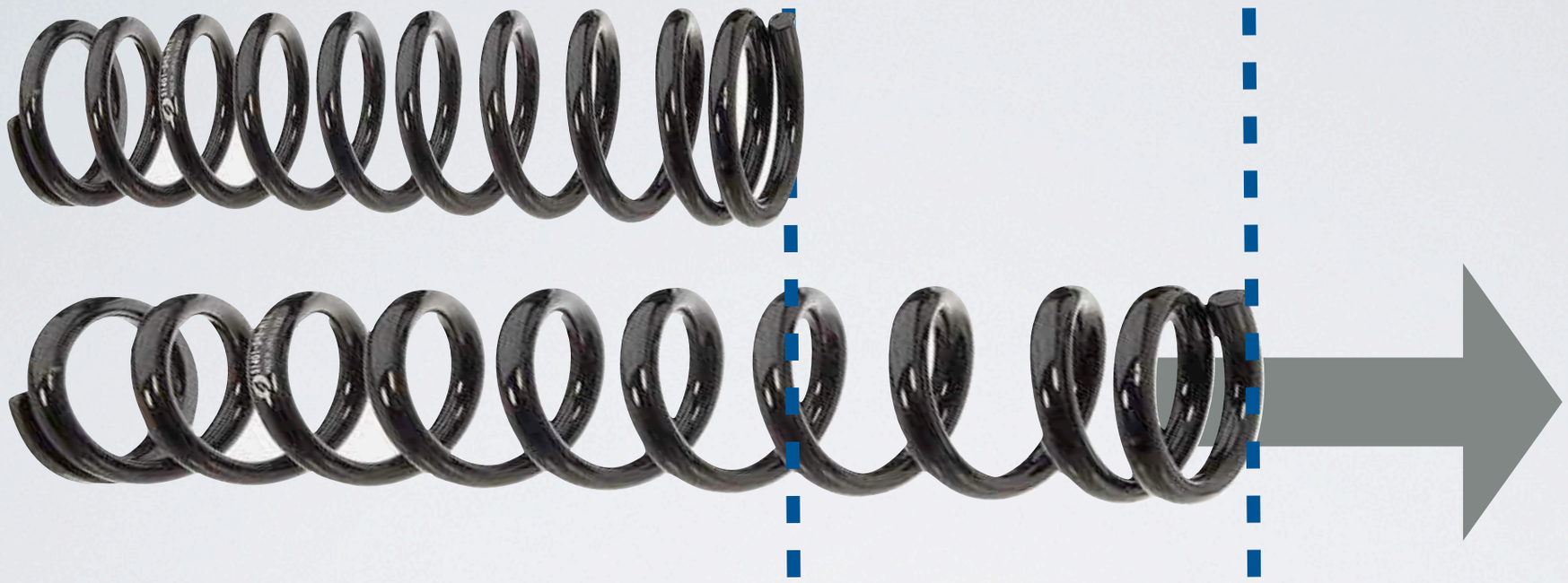
HOOKE'S LAW

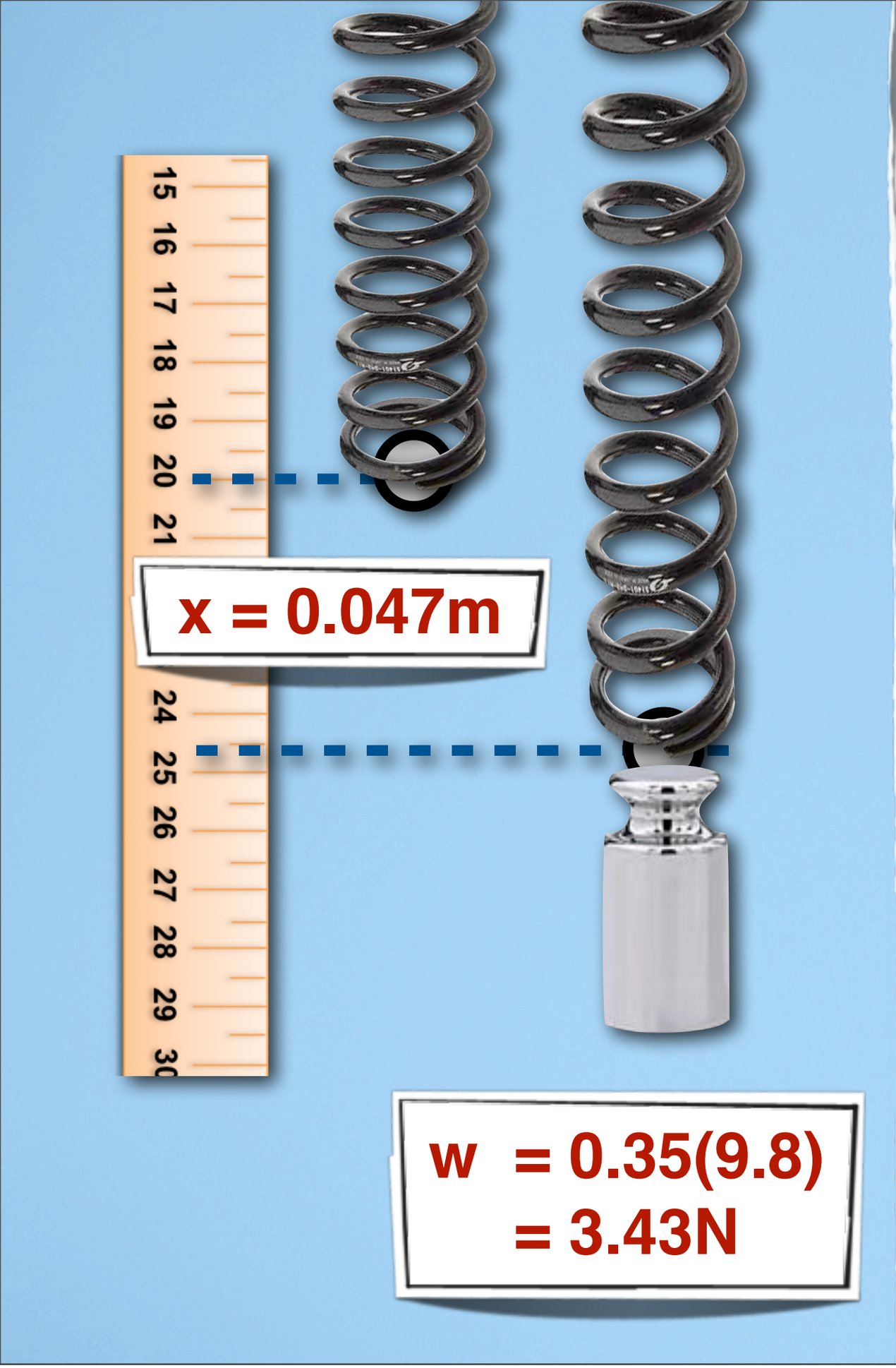

POCKET
BALANCE


ROBERT HOOKE
1635-1703
Scientist
Architect
Engineer

$$F = (-)\, k\, x$$



- Force - required to stretch the spring, or restoring force. Often the weight (N)
- k - Spring Constant - How "tight" the spring is. (N/m)
- x - Stretch - a change in length (m)



DIRECT CALCULATION

A 350g mass is placed on a 20cm spring causing it to stretch out to 24.7cm.

Find the spring constant of this spring.

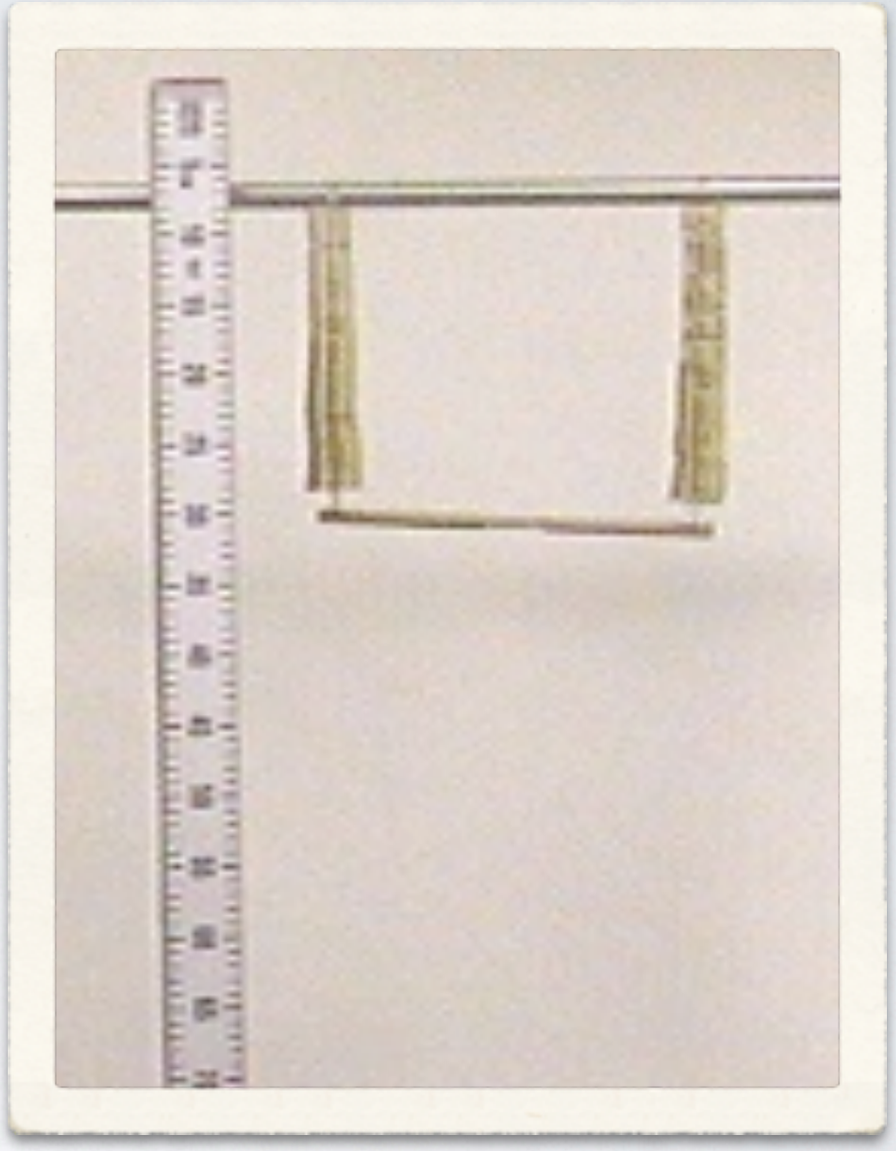
$$F = k\,x$$

$$3.43N = k\,(0.047m)$$

$$k = 72.97\ N/m$$

SPRINGS IN PARALLEL

- The same force is supported by two springs so neither has to stretch as far...
- ...or, it is harder to stretch two springs so the constant is increased
- $k = k_1 + k_2$

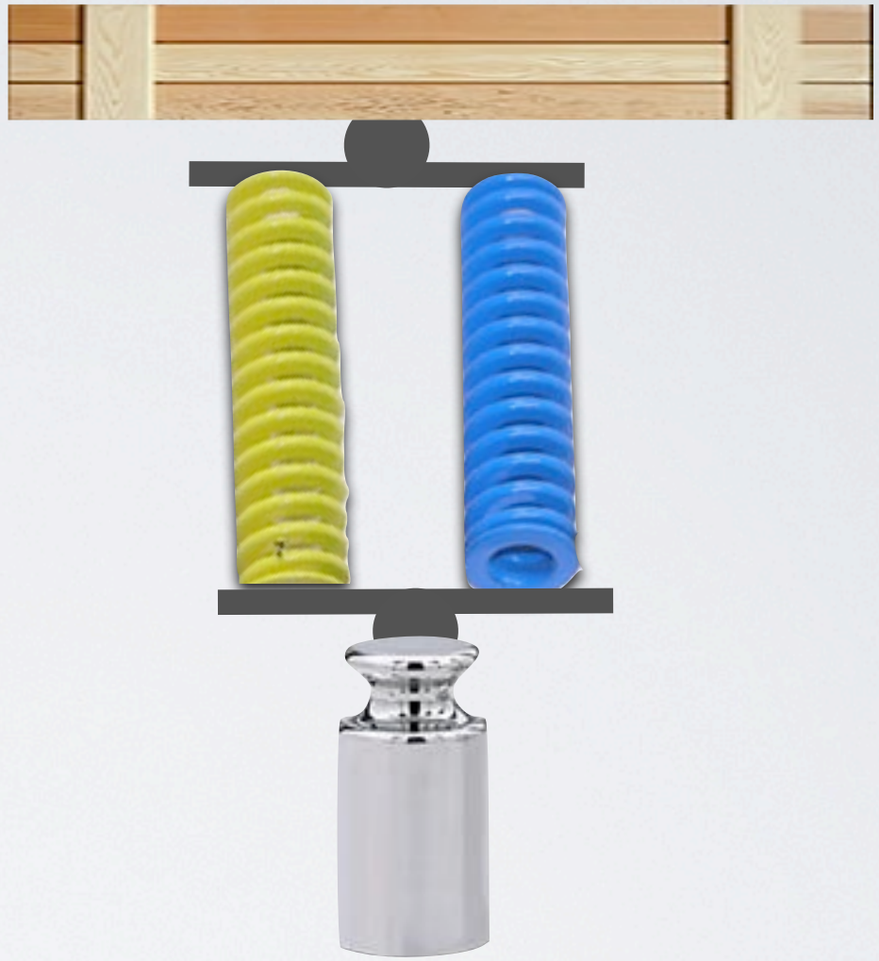


k_1=20 N/m

k_2=60 N/m

k_3=90 N/m

WHAT WOULD THE TOTAL CONSTANT BE IF....



60 + 20 = 80

SPRINGS IN SERIES

- Both springs support the same amount of weight (not split in two like before)...
- or... it is easier to stretch
- $1/k = 1/k_1 + 1/k_2$

k_1=20 N/m

k_2=60 N/m

k_3=90 N/m

WHAT WOULD THE TOTAL CONSTANT BE IF....

1/60 + 1/90 = 1/k tot

type: 60 (x^{-1}) + 90 (x^{-1}) =

then: (x^{-1}) =

k tot = 36 N/m

HOOKE'S LAW LAB

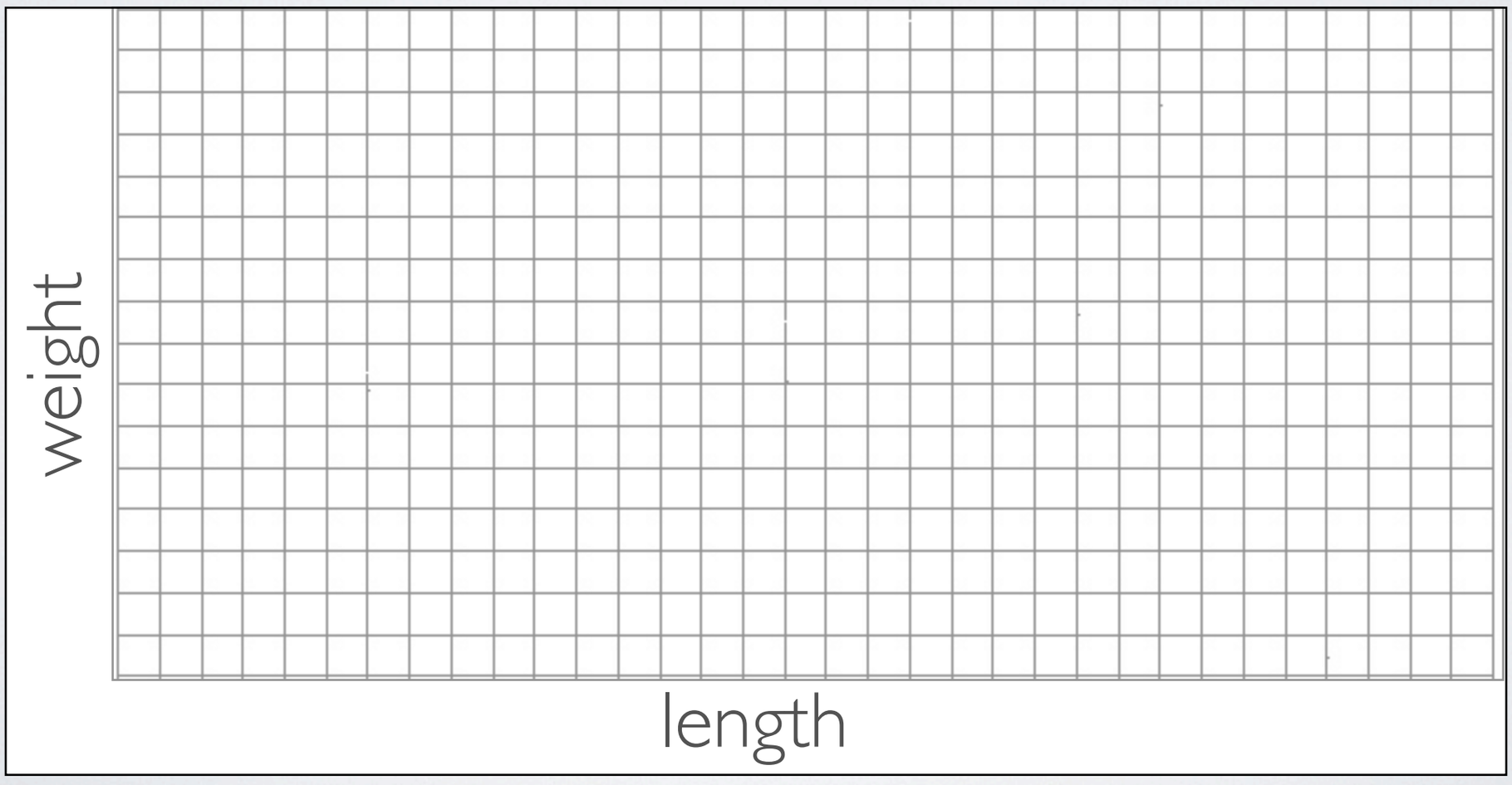
Which Spring:			
#	**Mass**	**Weight**	**Length**
1			
2			
3			
4			
5			
6			

4 TRIALS; 2 SPRINGS, & SERIAL, & PARALLEL

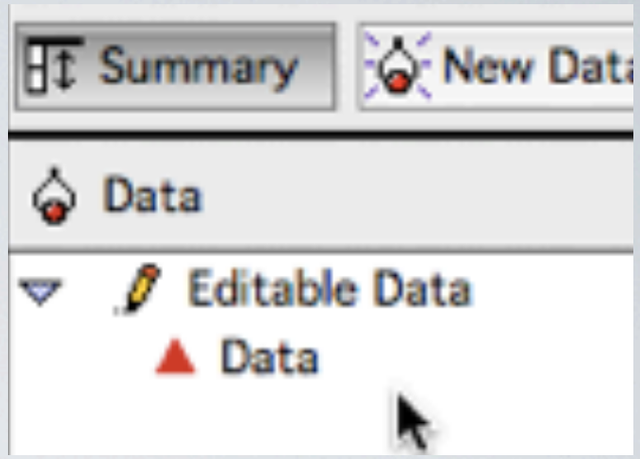
HOOKE'S LAW LAB

Pick 2 of your springs and graph your results. Place the weight on the y axis and the length on the x axis. Find the slope of each graph to find the spring constant.

k = _____



SUBMIT YOUR WORK



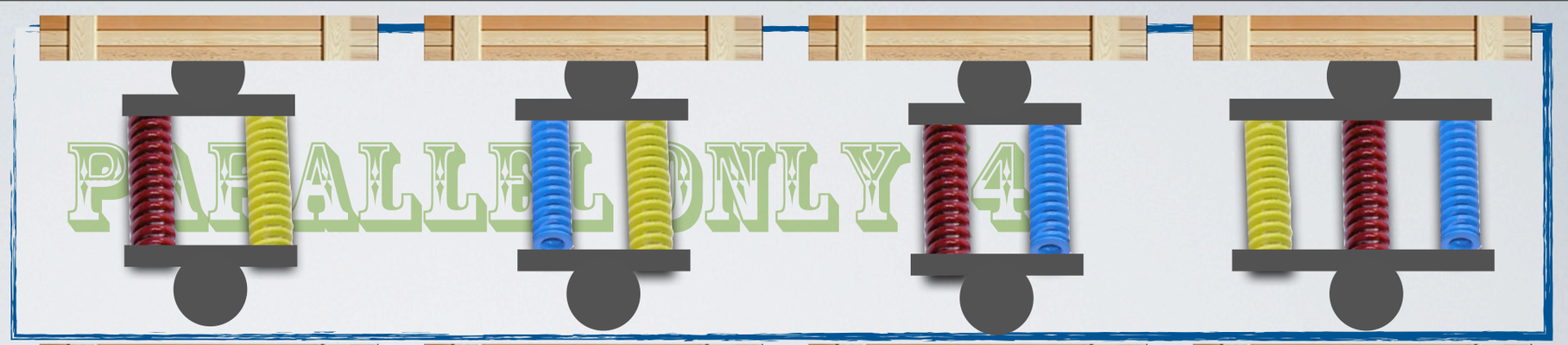
- make your graph using ***data studio***
- click on the ***summary*** button, then double click the ***red triangle- Data*** to edit your graph.
- under the ***general*** tab- replace ***x*** and ***y*** with *your* axis labels
- replace "***Data***" with *your* title
- press the ***print screen*** button on your keyboard
- Create a word doc with your names, tables & graphs, and k value results.
- Submit at hainepages.com under the ***main*** tab

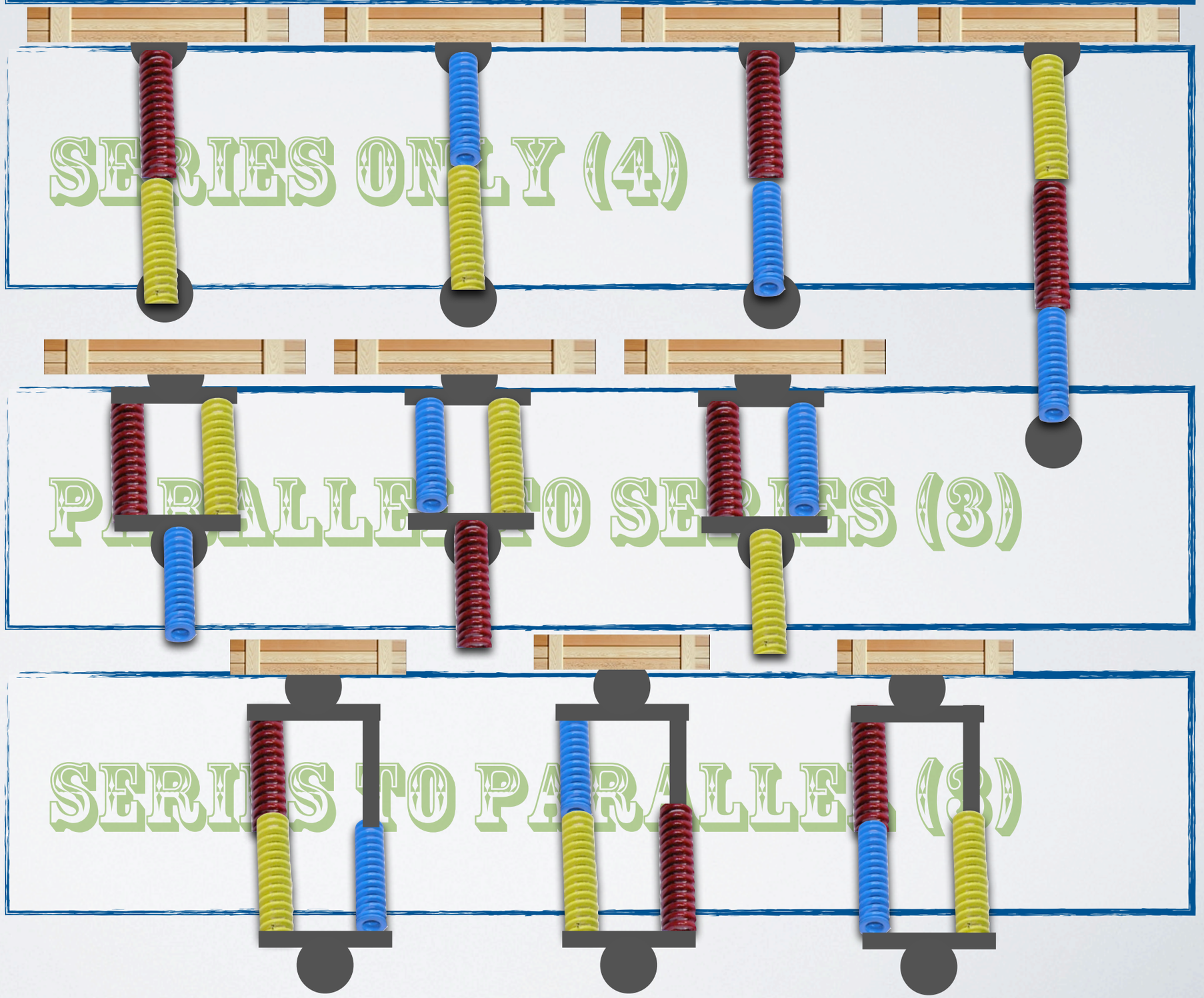
HOW MANY COMBINATIONS?

k_1=20 N/m

k_2=60 N/m

k_3=90 N/m





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k_1=20 N/m

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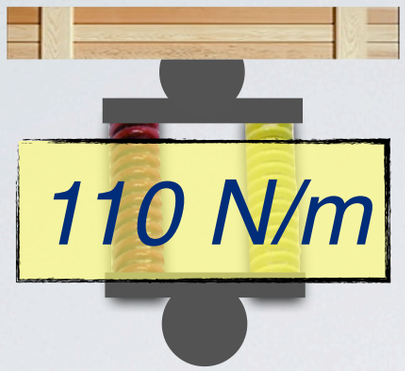
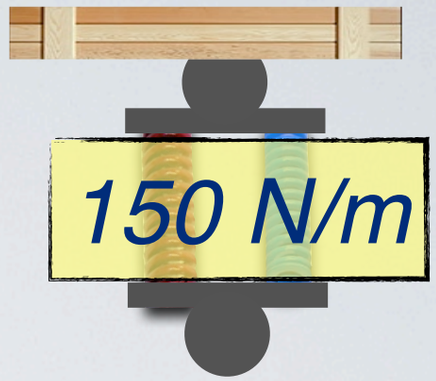
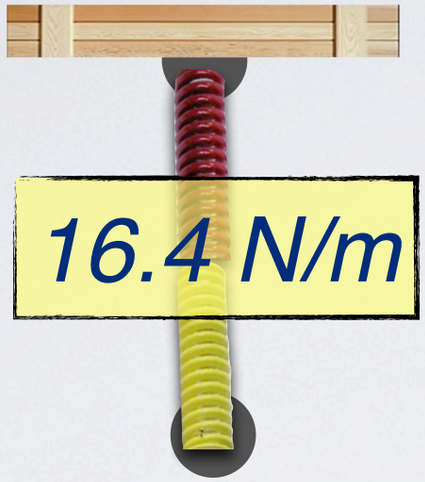
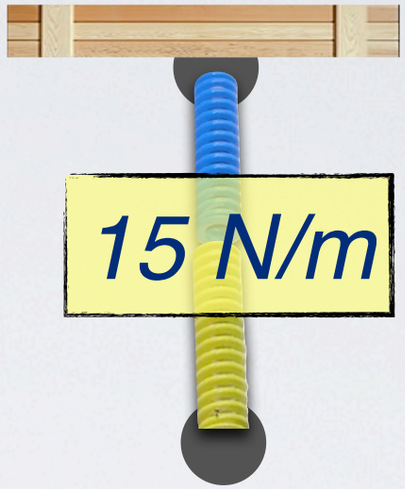
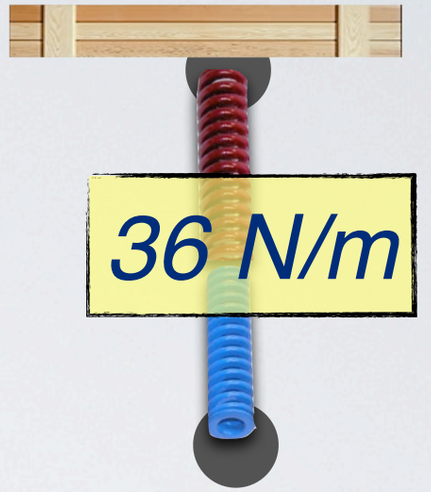
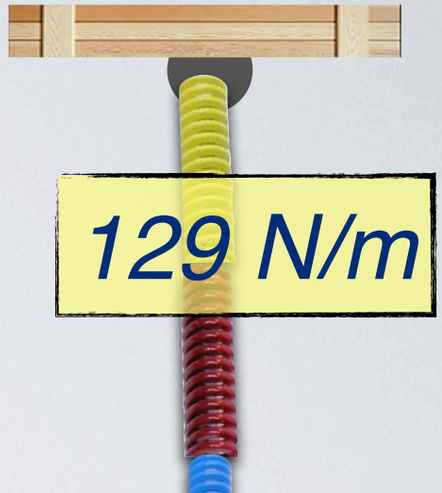


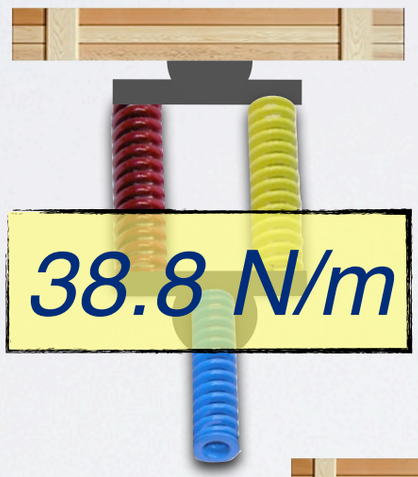


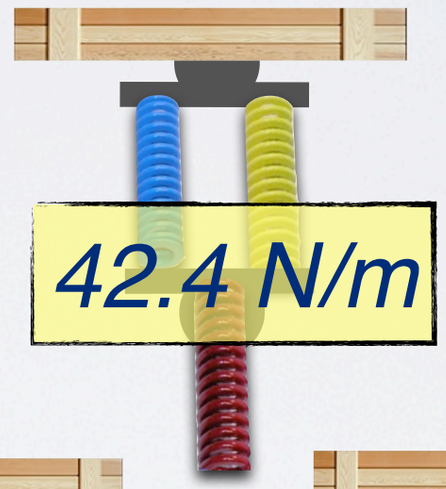


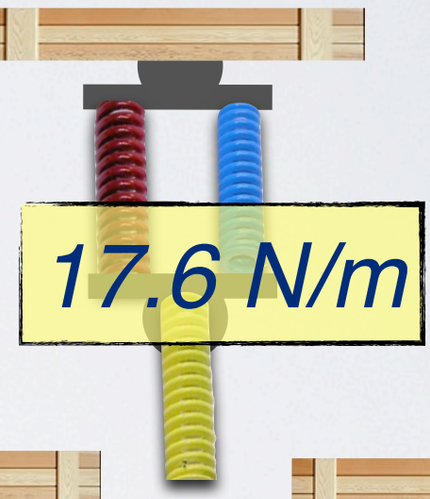


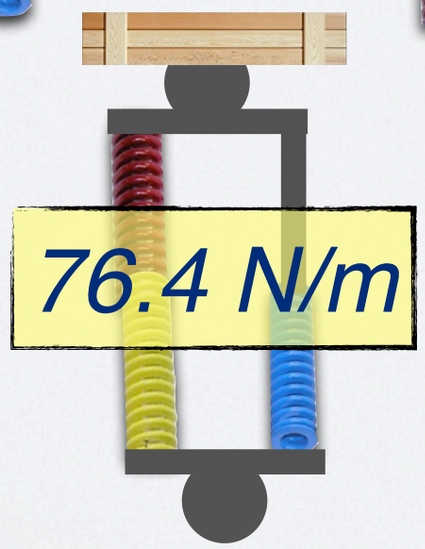


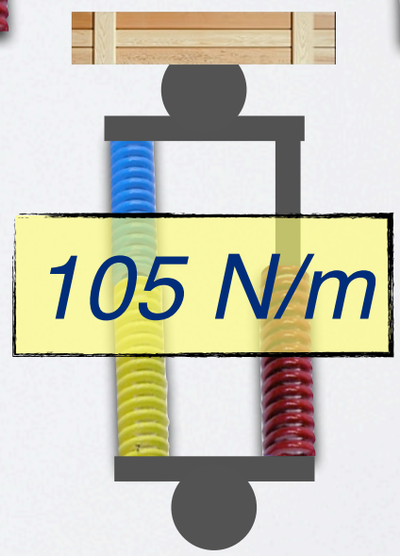




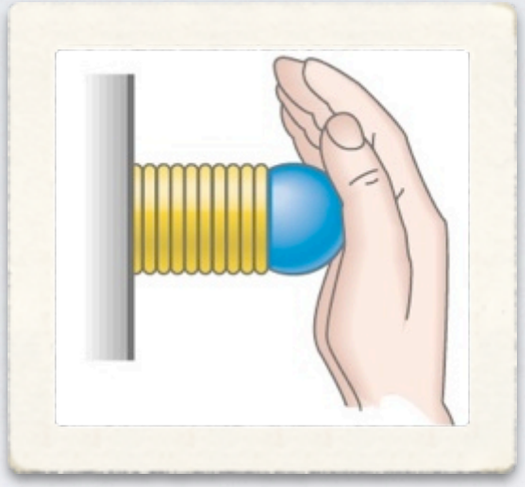




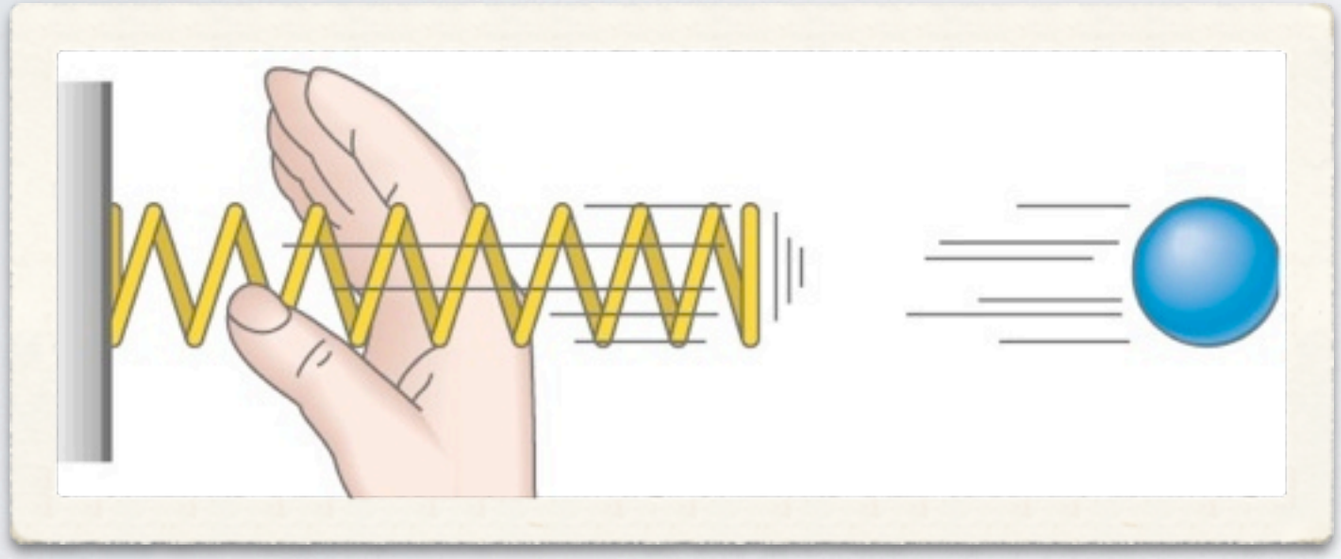




ELASTIC POTENTIAL ENERGY



- $W = FD$
- $F_{avg} = \frac{1}{2}kx$



- $W = (\frac{1}{2}kx)(x)$
- $W = \frac{1}{2}kx^2$
- $PE = \frac{1}{2}kx^2$