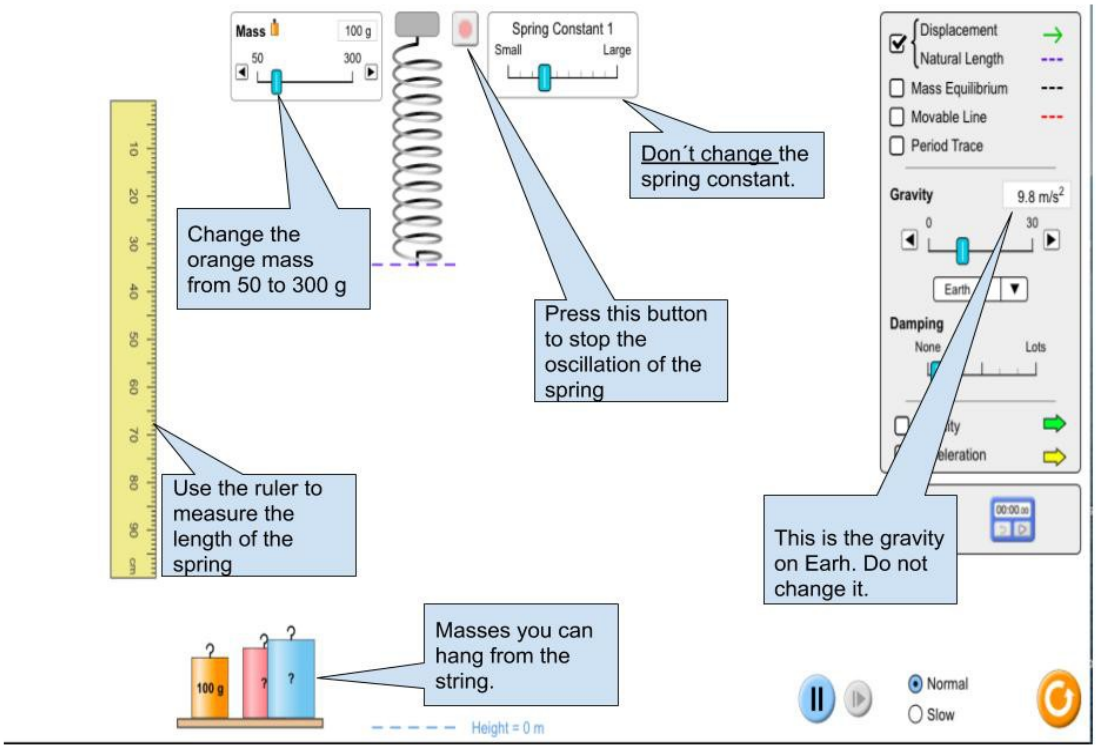
HOOKE'S LAW. EXAMPLE

In this laboratory you will determine the constant of a spring using a simulation. Go to:

https://phet.colorado.edu/sims/html/masses-and-springs/latest/masses-and-springs_en.html

and click in the option "Lab"



RESULTS

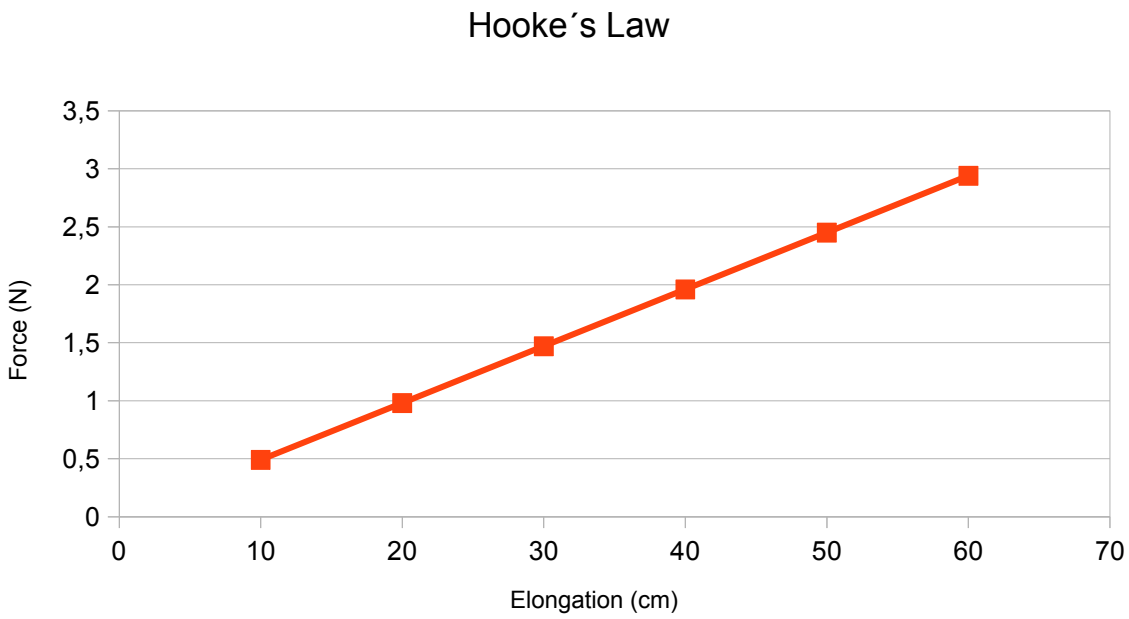
Mass (g)	Force (N)	Δl (elongation, cm)	Spring constant $k=\frac{F}{\Delta l}$ (N/cm)
50	0,49	10	0,049
100	0,98	20	0,049
150	1,47	30	0,049
200	1,96	40	0,049
250	2,45	50	0,049
300	2,94	60	0,049

Force is calculated multipying mass (in kg) by the acceleration of gravity (9,8 m/s^2). For example, when mass is 50 g, force is

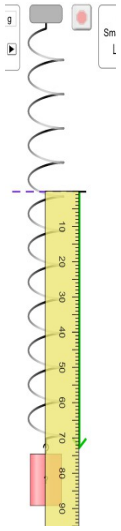
$$F = 0{,}05\ kg \cdot 9{,}8\ m/s^2 = 0{,}49\ N$$

Elastic constant = 0,049 N/cm

GRAPHIC RESULTS



Determine unknow masses



Red gives an elongation of 73 cm

We use Hooke´s Law:

$F=k\cdot\Delta l = 0{,}049\ N/cm \cdot 73\ cm = 3{,}58\ N$

As $F= m\cdot g$; $m=F/g$

$m = 3{,}58\ N / 9{,}8\ m/s^2 = 0{,}365\ kg = 365\ g$

Blue gives an elongation of 46 cm

We use Hooke´s Law:

$F=k\cdot\Delta l = 0{,}049\ N/cm \cdot 46\ cm = 2{,}25\ N$

As $F= m\cdot g$; $m=F/g$

$m = 2{,}25\ N / 9{,}8\ m/s^2 = 0{,}230\ kg = 230\ g$