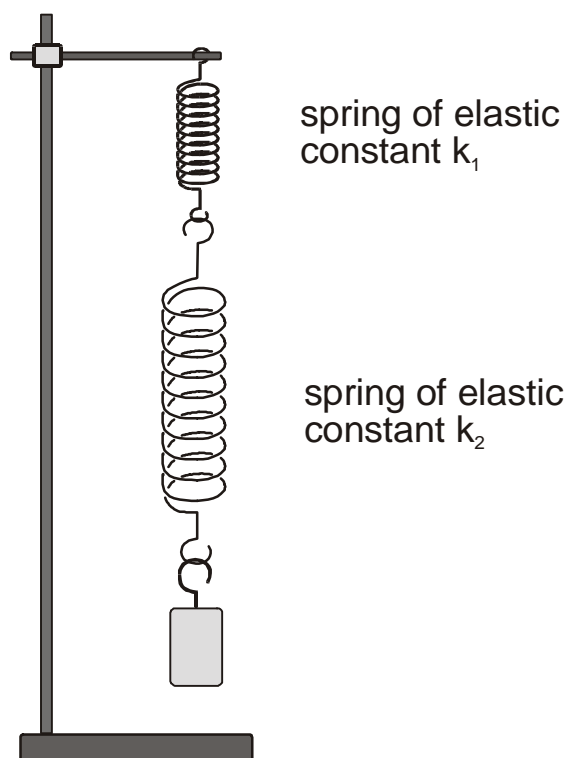


## Springs and Elasticity

- Preparation:**
  - Read about Hooke's Law and elasticity.
  - See parts 3 and 4 below.
- Measure the elastic constants,  $k_1$  and  $k_2$  of two springs. Make sure that you choose springs having significantly different elastic constants. Repeat the experiment with the two springs "in series", as shown below. Find the effective value of the elastic constant,  $k$  of the two springs together.



Take your values of  $k$  from graphs of force against extension.

Plot all the graphs on the same set of axes.

Hooke's law is usually stated as an equation relating the extension of the spring to the force exerted by the spring on the mass hanging on it. This force will, of course, be equal in magnitude but opposite in sense to the weight of the mass causing the extension. For this reason, Hooke's law is often written as  $F = -kx$

3. Using Hooke's law, find a mathematical relation between  $k$ ,  $k_1$  and  $k_2$ . See if your experimental results verify this relation.
4. Similarly, find a relation between the three  $k$  values for the situation shown below.

