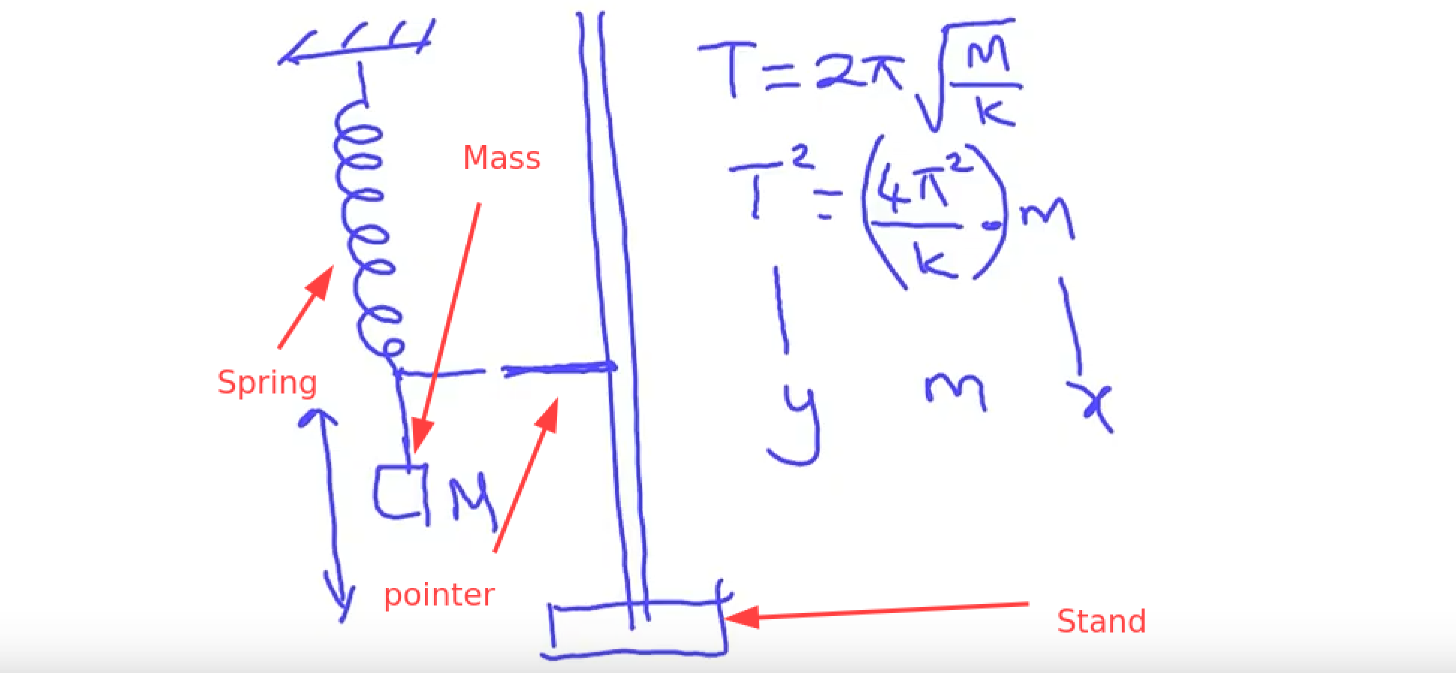
Finding the spring constant of a helix spring

> There is a relationship between the time period of oscillation (T) and the mass (m) we attach to a helix spring when oscillating

$$T = 2\pi\sqrt{(\frac{m}{k})}$$
$$\therefore T^2 = \frac{4\pi^2}{k}m$$
$$y = mx$$

- Initial setup



- Even though we can start with any mass, we use a mass of 100g or more. Why?

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With 50g, you might not be able to get a enough extension of the spring to get the time period for 20-25 osccilations. Therefore we start with 100g
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> This is totally dependent on the spring constant of the spring. If you are using a spring with a lower spring constant, even 50g could be enough to get a appropriate extension to count 20 oscillations

- What is the arrangement you have to change every time you increase the mass?

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You need to make sure the pointer is parallel(colinear) with the pointer of the spring
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> The unit of the spring constant is Nm^{-1}

- For the equation $T = 2\pi\sqrt{(\frac{m}{k})}$ we don't consider the mass of the spring, if we take that as well, the equation becomes as follows

$$\begin{aligned} mass\ of\ the\ object\ &= M \\ mass\ of\ the\ spring\ &= m \\ \therefore T = 2\pi\sqrt{(\frac{M + \frac{m}{3}}{k})} \end{aligned}$$

- To draw the graph, we have to re-arrange it as follows

$$\begin{aligned} T &= 2\pi\sqrt{(\frac{M + \frac{m}{3}}{k})} \\ T^2 &= (\frac{4\pi^2}{k})M + (\frac{4\pi^2 m}{3k}) \\ y &= mx + c \end{aligned}$$