Name	Partner	Date
Spring ID Number:	Spring Mass (m_s):	Spring Length (L_0): 0.18 m

Measurements for characterizing spring

Mass	Force	Position

Results

Equilibrium position: $y_0 \pm \Delta y_0 =$ ____________

Spring Constant: $k \pm \Delta k =$ ____________

Verification

New Trial Mass: $m =$ ____________

Predicted Position: $y \pm \Delta \mathrm{y} =$ ____________

Measured Position: $y \pm \Delta y =$ ____________

Does your predicted position of the mass agree within uncertainties with your measured position?

Sonic Ranger Gain:	Sonic Ranger Offset:	Hanging Mass (m):
172.9 m/s	-0.436 m	

Period of oscillating mass by using cursors and counting oscillations ($T \pm \Delta T$):

Fit of data to $y(t) = y_0 + A\cos(\omega t + \phi)$:

Equilibrium position: $y_0 \pm \Delta y_0 =$ ____________

Amplitude: $A \pm \Delta A =$ ____________

Angular frequency: $\omega \pm \Delta \omega =$ ____________

Phase angle: $\phi \pm \Delta \phi =$ ____________

Calculation of period from best fit:

Period: $T \pm \Delta \mathrm{T} =$ ____________

Theoretical period based on spring characteristics:

$T = 2\pi\sqrt{\frac{m}{k}} =$

Name	Partner	Date
VPython simulation of position versus time: How does the period from the simulation compare to the theoretical period?		
What additional physical factor(s), not included in the basic theoretical model we used, might affect the period of the oscillator?		
What is the value of the effective mass needed to get the theory to match the measured period?		
What is the ratio of the (“extra” mass) / (spring mass)?		
Write a paragraph that summarizes these results and describes how the ratio you found compares to the ratio found in the energy model from your pre-lab questions?		
Attachments: ☐ Annotated graph showing measured position vs time for simple harmonic oscillator, with best fit. ☐ Annotated graph showing simulated position vs time for simple harmonic oscillator.		