Summary

This week, we empirically verified the formula for the period of an oscillation in springs. We did this by taking measurements of a vertically-hanging spring's behavior under an increasing supply of weights. We compared the percent error between the observed period and the theoretical period.

Data

Prediction and measurement of period T:

m_w Mass of slotted weights	M $m_w + m_{wh} + \frac{1}{3} m_s$	T_p $2\pi\sqrt{\frac{M}{k}}$	T_n	n	T_m $\left(\frac{T_n}{n}\right)$	Percent Error
grams	grams	s	s		s	%
100	126.667	0.5051	25	50	0.5	1.01099
150	176.667	0.5965	29	50	0.58	2.7703
200	226.667	0.6757	32	50	0.64	5.2816
250	276.667	0.7465	38	50	0.56	24.983

Analysis

I think it's fairly intuitive that we would take the mass divided by the force constant in the calculation of the period. I think the error getting larger as the weight gets larger makes sense, because the spring's behavior would get more erratic at extremes. Another source of error might be that the masses are imperfectly calculated. We didn't get much into how *k* was calculated, but I imagine there are also sources of error there.