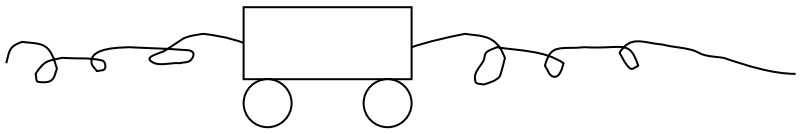
Simple Harmonic Motion Lab Name _____

Part I – Measure the effective spring constant of two springs.

Hook up both springs to a cart (as poorly shown below):



Measure the period several times by varying the mass. Do at least 6 or 7 trials.

Total Mass	Total Time	Period

The relationship between period and mass is given by

$$T = 2\pi\sqrt{\frac{m}{k_{eff}}}$$

What two variables can you plot so that the slope of a linear fit would allow you to calculate k_{eff}?

Using Excel, generate your graph and determine the slope. Because of the limited data, it would probably help if you set the y-intercept equal to zero. Print out your graph.

Slope = _____

What is your value for k_{eff}?
(Show any relevant work below)

k_{eff} = _____

Part II – Measure the spring constant of each individual spring

Find the spring constant for each spring by hanging different masses and measuring the vertical displacement.

Spring 1				*Spring 2*		
Mass	Force	x		Mass	Force	x

Using Excel, generate a graph for each set of data whose slope is equal to the spring constant.

Save your graphs and submit with this document.

Part III – Find k_{eff} using Newton's Laws

Draw a force diagram for the cart when it is displaced a certain distance and write down Newton's Second Law for the cart in Part I.

Derive an expression for the period of the cart.

Using the two spring constants from the graphs in Part II, what should have been your value for k_{eff}?

How close were you? Find the percent difference.