NAME _____ DATE _____

Scenario

You are given a long length of string and an oscillator that can shake one end of the string at any desired frequency. The oscillator has a display that indicates the frequency. You are asked to design an experiment to determine the velocity of the standing waves on the string.

Experimental Design

PART A: Describe your experimental setup and procedure, including any additional pieces of equipment you would need and the kind of data you would record. Include enough detail that another student could follow and complete the experiment.

PART B: Describe how you would analyze your data to determine the velocity of the waves on the string.

A student performs the experiment and collects the following data:

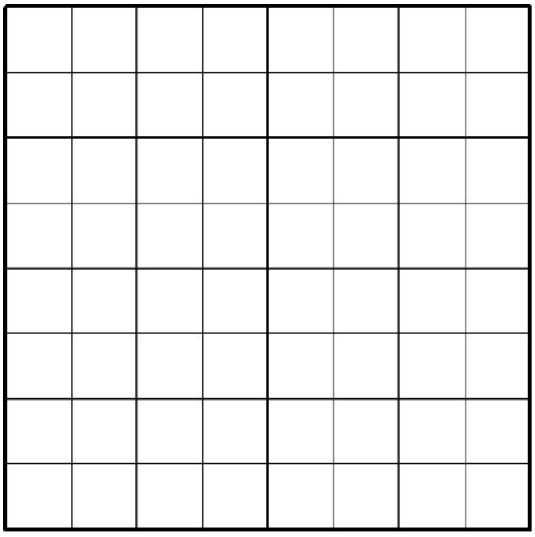
n	*Sketch*	$\lambda(m)$	*f(Hz)*	
1		2	100	
2		1	200	
3		0.7	300	
4		0.5	400	
8		0.25	800	

Data Analysis

PART C: Fill in the "sketch" column with what you would expect the wave to look like.

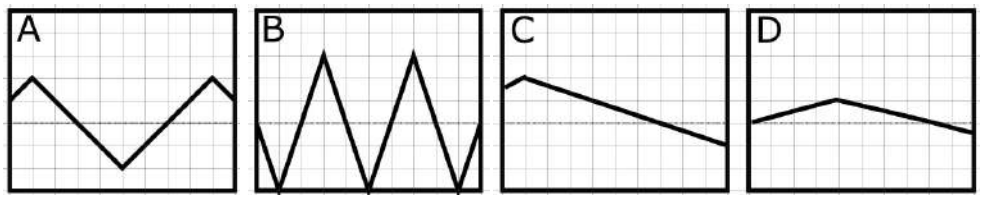
PART D: Graph the necessary data to solve for the speed of the wave on the string. (Fill in final column with additional values if necessary.) Sketch a line of best fit for the data.

PART E: Write an equation for the line of best fit and use it to determine the speed of the wave on the string.



Argumentation

PART F: These drawings represent snapshots taken of waves traveling to the right along strings. The grids shown in the background are identical. The waves all have the same speed, but their amplitudes and wavelengths vary. Rank the frequency of the waves. (Include <, >, or = to clarify your ranking.) Explain your ranking.



Highest frequency _____ > _____ > _____ > _____ Lowest frequency