

Sound Mini Lab

Name: _____

In this mini lab, you will be investigating the relationship between the amount of water in a container and the frequency of the pitch that it produces

[Start by watching this video walkthrough](#)

The Tools



PhyPhox

Free app to allow you access to the sensors in your device. To measure the frequency of a pitch, use the "Audio Spectrum" in the acoustics options



Microsoft Excel

To record and plot the data with a trendline, it is recommended that you use Microsoft Excel either as an iPad app or the desktop version on a computer

Part 1: Collecting the Data

Your lab set up has some choice based on the materials that you have access to. Indicate the method for producing a sound and units for measuring out the water that you will be using in the space below.

Method for producing sound (circle one)		
Clinking glass with a knife	Rubbing finger on glass rim	Blowing across bottle top

Units used to measure the amount of water (based on measuring equipment)	
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Collect your data by measuring out an amount of water into your container. Create the sound repeatedly using your chosen method and use PhyPhox to measure the peak frequency that is produced. Record your data for four non-zero amounts of water into your spreadsheet and average the three trials for each.

Write your data in the table below or insert a screenshot of your spreadsheet data:

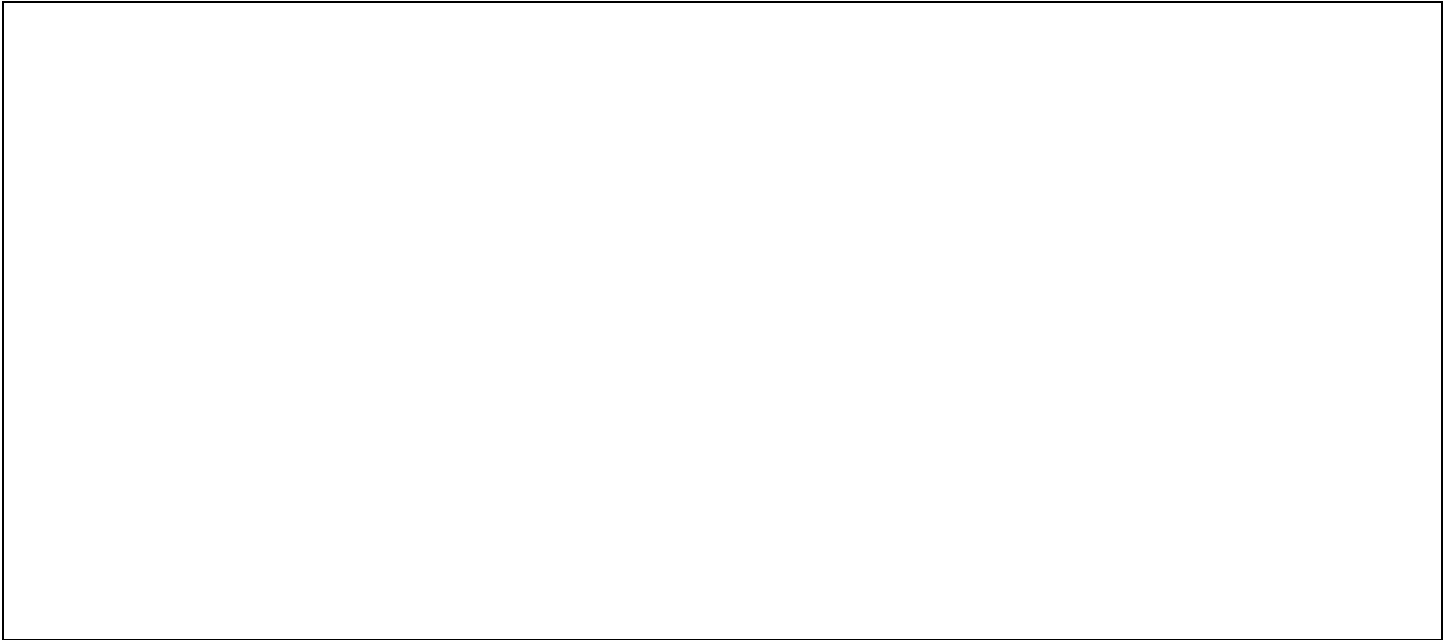
Frequency Data:

Amount of Water / []	Frequency / [Hz]			Average Frequency / [Hz]
	Trial 1	Trial 2	Trial 3	

Part 2: The Mathematical Model

Create a scatterplot of the amount of water and average frequency columns and add a trendline with an equation. Make sure that the independent variable (amount of water) is graphed on the x-axis.

Scatterplot:



Mathematical Model (trendline equation)	
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Part 3: Analysis of the Model

1. What is the slope with units?
2. What is the y-intercept with units?
3. What is the meaning of the y-intercept?
4. Does this model have an upper limit of water amounts that make sense? Why or why not?

Part 4: Testing the Model

1. Choose an amount of water that is different than any of the setups that you used in your data collection

Amount of Water to Test	
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2. Use your mathematical model to predict the frequency that will be produced with this amount of water.

Show work below:

Predicted Frequency	
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3. Measure out this amount of water and use PhyPhox to measure the frequency of the pitch produced

Measured Frequency	
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4. Calculate the percent error of your model's prediction

$$\text{Percent Error} = \left| \frac{\text{Predicted} - \text{Measured}}{\text{Measured}} \right| \times 100\%$$

Percent Error	
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