

#makingMath: Pan Pipes

Measure

- Use the tools provided to help you record the length of the pipe (where the air goes) and the frequency it makes when played.
- Measure the note with a tuning app. The iPad has PanoTuner already loaded on it.

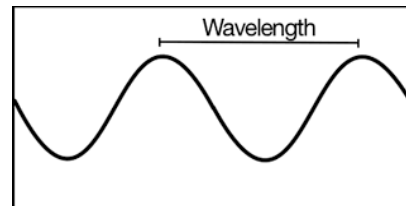
Notes:

Build

The relationship between the frequency, wavelength, and speed of sound is given by the following equation:

$$\text{Frequency} \times \text{wavelength} = \text{speed}$$

where **frequency** is the number of waves that pass a certain point in one unit of time, **wavelength** is the distance between the same point in a wave, as shown in the diagram, and **speed** represents the speed of sound (~343 m/s).



When you are creating a closed pipe, it needs only to be one-fourth of the wavelength, since the closed end bounces the wave back towards the opening.

- Pick a note from one of the songs that you would like to play with your bamboo pipe from above. If you are here with someone, pick different notes so you can start a Pan Pipe band.
- Use your measurements and calculations to cut the bamboo pipes (if necessary) to be the length you need

Notes:

Verify

- Test your note.
- If it did not make the note you wanted, check your calculations and measurements.
- If you didn't find your error ask another Maker to do the same.

Notes:

Test

- Once you have three notes in order play your song. Hot Cross Buns is below as an option.
- How do the notes sound together?

Notes:

If you have different notes than BAG, the highest note is B the middle note is A and the low note is G. As long as your notes are in order it should sound ok.

B A G

Hot Cross Buns

B A G

Hot Cross Buns

G G G G, A A A A

One a pen-ny, two a pen-ny

B A G

Hot Cross Buns