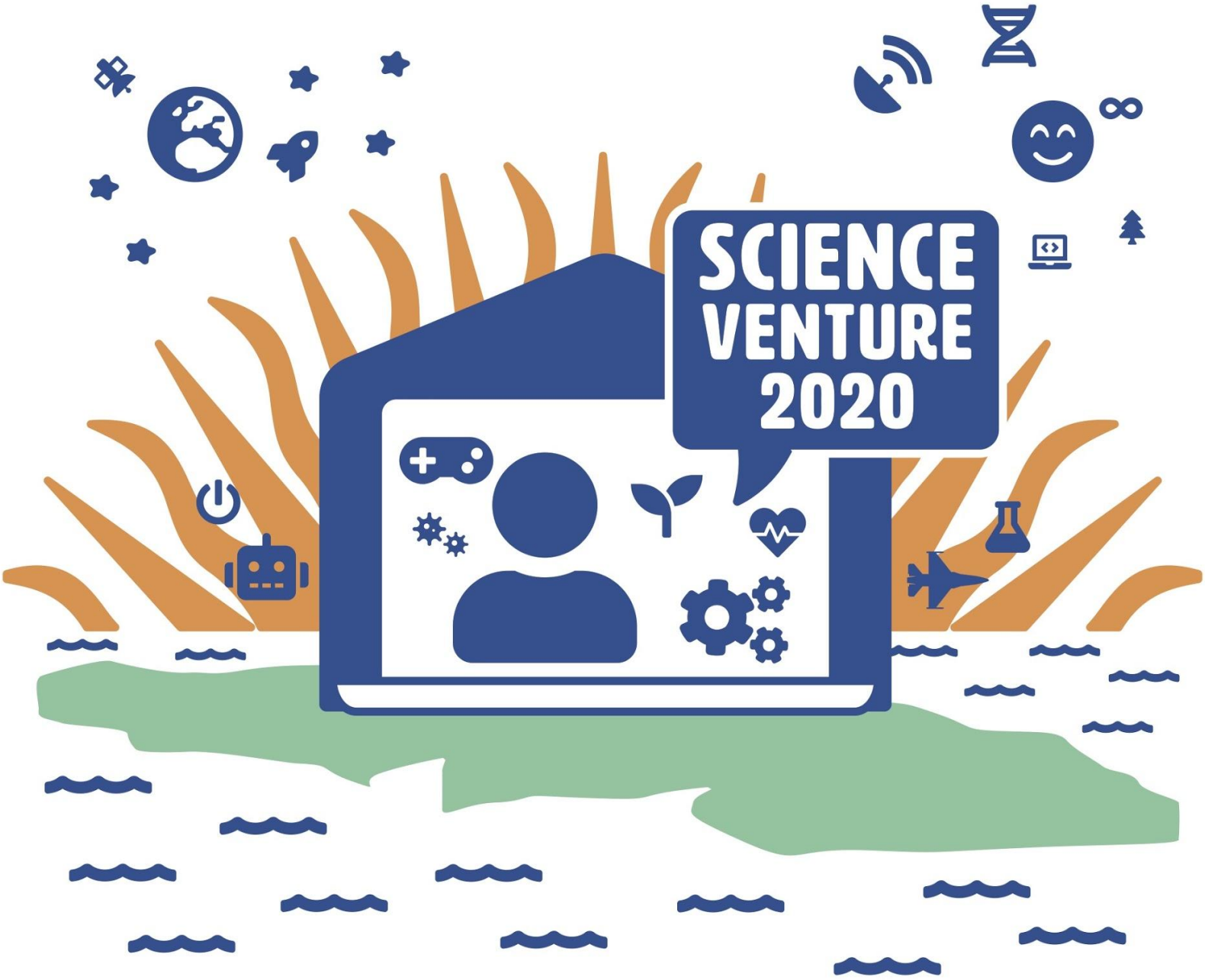


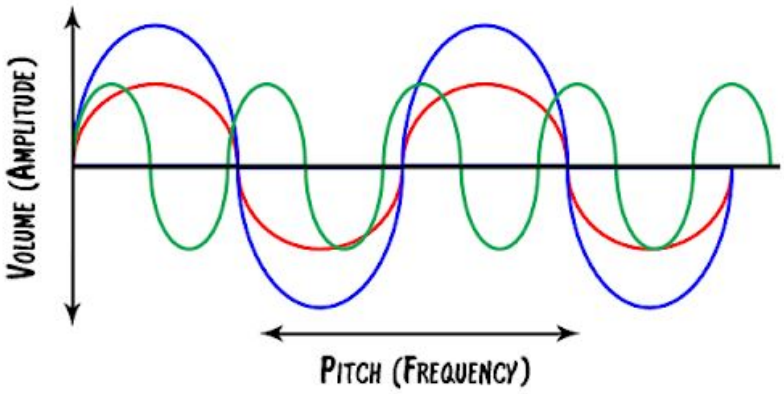
Music Makers

Pitch & Frequency

Using cups or rubber bands, campers will experiment with pitch and frequency and make their very own musical instrument!

Materials

- Cups of various sizes
- Water
- Rubber bands of various sizes
- Box
- tuning/pitch app (online or on phone)
- Stick



Keywords & Concepts

Vibration: periodic back-and-forth motion of a particle or object.

Sound: energy from the vibrating of an object. Travels as a wave.

Frequency: measurement of how fast the sound wave is oscillating or how many vibrations happen during a set amount of time.

Pitch: how ears and brains understand sound wave frequencies. A lower frequency sound wave will sound deeper and low pitch, while a higher frequency will sound higher pitch.

Amplitude: the height of a sound wave.

Volume: how ears and brains understand sound wave amplitudes. A higher amplitude wave will sound louder, while a lower amplitude will sound quieter.

Pitch & Frequency

Rubber Band Instrument

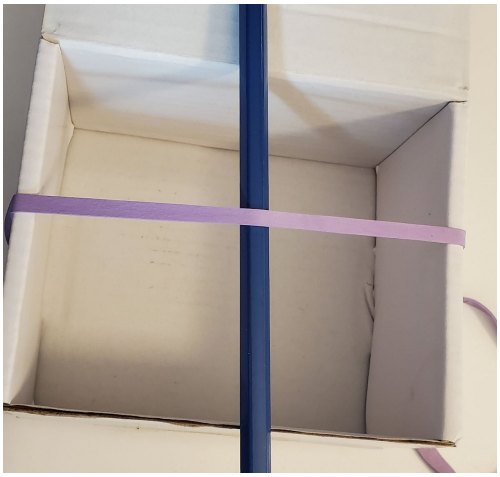
Steps:

1) Arrange your rubber bands from thinnest to thickest.

2) Place them in that order around the box. If the bands are too small to wrap around the box, use staples or tape to attach them to both sides of the box.

3) Pluck each rubber band, observing and recording your findings.

4) Place the stick across the box but under the rubber bands. This will stretch the bands slightly. Pluck the bands and observe the change in the sound. Do this with the stick being at different locations



Pitch & Frequency

Cups of Water Instrument

Steps:

1) Gather about 5 cups that are the same size.

2) Fill each cup with different amounts of water. An example of these amounts is: 1 cup of water, ½ cup of water, ⅓ cup of water, and ¼ cup of water.

3) Using the stick, gently hit the side of each cup, observing and recording your findings.

4) Now, gather about 5 cups of different sizes.

5) Fill each of these cups with the same amount of water.

6) Hit the side of each cup, observing and recording your findings.

Finding the Pitch

Steps:

1) Using a tuning or pitch app off of your device, find the note and pitch each rubber band and cup makes.
   a) Here is a good website to use: https://tuner.ninja/

2) Record your findings and/or fill out the table below.

Pitch & Frequency

Observation Tables:

Rubber band	Sound without stick	Sound with the stick in position 1	Sound with the stick in position 2	Sound with the stick in position 3
Thinnest				
Thickest				

Rubber band	With or without stick?	Note (using app)	Pitch (using app)

Pitch & Frequency

Observation Tables:

Cup (all same size)	Sound description	Note (using app)	Pitch (using app)
Least water			
Most water			

Cups (same amount of water)	Sound description	Note (using app)	Pitch (using app)
Smallest cup			
Largest cup			

Pitch & Frequency

Extensions

1) Wet your finger and run it around the top of each cup. You should get a very different sound than when you hit the cup. How do these sounds differ and why might they?
2) Try to play a simple song using the cups and/or the bands. Was this hard?

Debrief

1) How does the thickness of the rubber band affect the sound?
    a) thicker= deeper
    b) thinner= higher pitch

2) How did the sound change when we put a stick under the rubber bands? Did the location of the stick also affect the sound? Why or why not?
    a) Should increase the pitch

3) When all the cups are the same size, how does the amount of water affect the sound?
    a) Less water= higher pitch
    b) More water = lower pitch

4) When each cup has the same amount of water, how does the size of the cup affect the sound?

5) How do the rubber bands sound different than the cups of water? Why might this be?
    a) They are different states of matter (liquid vs solid). The medium sound goes through affects how it sounds. That's why talking underwater sounds so different than taking above water.

#SVatHome

Want to share your project or results with us?

Email or tag us @ScienceVenture

Have a question?

Reach us at svcamp@engr.uvic.ca