



## Try This at Home Science: Water Xylophone

### Activity Overview:

Use vibrations to create your own water xylophone!

### Materials:

- 4-6 tall glasses, all the same shape and size
- Pitcher of water
- Plastic or wooden spoon
- Food coloring (optional)



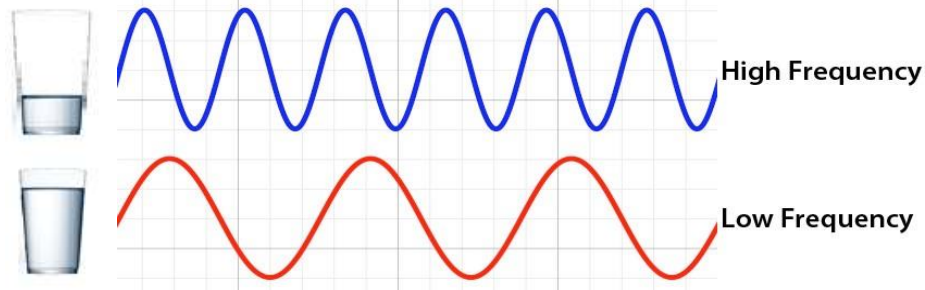
### Try this!

1. Tap on each of the empty glasses with your spoon and make observations about the sound you hear.
2. Fill the first glass  $\frac{3}{4}$  the way full with water.
3. Fill the second glass a little less, third glass a little less, and so on, so the water levels are in a stepwise fashion.
4. If using food coloring, add 3-5 drops in each glass and stir.
5. Now, line up the glasses from most to least full.
6. Use the spoon to gently tap on each of the glasses and listen carefully. What do you notice? Do they sound the same as before?

### What's happening?

If you tap on the glasses when they are empty, you will notice they all sound the same. Once you add water to each, the sound will change. When the spoon is gently tapped against the side of the glass, the glass vibrates and in turn vibrates the water inside. That vibration is the sound you are hearing! The number of vibrations every second determines the pitch of the sound, or how low or high it sounds.

The glass that is most full of water slows the vibrations down the most. This is due to the glass having more liquid (or matter) for the sound to travel through, thus creating fewer vibrations per second. This produces a low pitch sound with low frequency. The glass with the least amount of water, or no water, allows for more vibrations to be generated per second. This is due to having less liquid for the sound to travel through. This produces a higher pitched sound, with a high frequency.



### How do we perceive sound?

Sound is everywhere! When we hear the sounds that the glasses in this experiment make, we are actually sensing vibrations. The number of vibrations per second is known as frequency. Humans can hear only a small range of frequencies (20-20,000 hertz), compared to other animals (7-100,000 hertz).

While humans can easily hear the trumpet of an elephant, we are unable to hear an elephant's rumble. Elephants can produce soft, powerful sounds that are infrasonic, or below the lower limit of human hearing. These low rumbles don't just travel far; they also create beautiful music that allows far away male elephants to calculate their distance from a female.



### Now try...

- Experiment with changing the water levels to create new sounds
- Experiment using different materials to tap on the glasses. Form a hypothesis on what you think will happen and then test it!
- Experiment using different liquids. Is there a difference of sounds between water and oil? What about milk?