

Water Xylophone

When people learn how to play a musical instrument, they study beautiful songs. They might not realize that music is more than melodies. Music involves science!

Musical sounds are produced when something vibrates back and forth. Vibration causes tiny particles called molecules to move. The molecules bump into each other. This movement is called sound waves.

Let's think about the xylophone. The xylophone is an instrument that is made up of a row of metal bars. These bars are lined up from longest to shortest. A mallet is used to play the xylophone. The xylophone player uses the mallet to tap the metal bars. Each time a bar is tapped, it vibrates. This vibration produces a sound. The bars have different sounds because they are different lengths.



Make Your Own Xylophone

Here's a great musical science experiment. You can make your own xylophone with water, drinking glasses, and a spoon. Just follow these instructions. You will be making music—and science!

Before You Begin

Ask an adult to help you find six to eight tall drinking glasses. These glasses should be the same size. They must be made of glass. Plastic cups will not work. Next, find a good space to work, such as your kitchen table. Then, gather all of the items that you will need to make your xylophone.

What You Need

- large pitcher or jug
- water
- food coloring
- metal spoon or wooden spoon



What You Will Do

First, fill the pitcher with water. Add food coloring to the water and mix it in. This will make the water more visible in each glass.



Second, line up the glasses in a row on the table. Tap on each of the glasses very gently using your spoon. What do you hear? Did you notice that all of the sounds are the same?

Third, begin to fill the glasses. Leave the first glass empty. Then add the colored water to the other glasses. Pour some water into the second glass. Pour a little more water into the third glass. Continue until you have filled the last glass. The last glass should be

filled almost all the way to the top. Inspect all of the glasses to make sure that the water levels gradually increase.



Fourth, use the spoon to tap each glass. Start by tapping the empty glass and then go on to the next. Are the sounds the same or different? How are the sounds changing?



What is Happening?

When you tap the glass with the spoon, you are making the air inside vibrate. When the air vibrates, it creates a pitch. Fast vibration means a high note or pitch. Slow vibration means a low note or pitch. Tapping the glass causes sound waves to travel through the water. Sound waves move slower when they travel through water. The pitches get lower as you add more water to the glasses. When there is less water inside of the glass, the opposite happens: the pitch is higher. The empty glass has the highest pitch, and the glass with the most water has the lowest pitch.



What Else Can You Do?

Now that you have created a xylophone with water and glasses, you can try other things. Find glasses that are different sizes and see if you get different results. Then, try to compose a simple tune with the glasses. You may need to change the water levels in some of the glasses to get the correct notes you want. Your friends and family will be a great audience for your scientific musical show!