



Curiosity Guide #608

Piano Science

Accompanies Curious Crew, Season 6, Episode 8 (#608)

Amplified Forks

Investigation #5

Description

You can tune a piano, but you can't tuna fish! Have you ever investigated a tuning fork?

Materials

- Tuning forks of different sizes
- Rubber mallet
- Wood tables of different sizes
- Friends

Procedure

- 1) Strike a tuning fork on a rubber mallet and hold the fork in the air.
- 2) What do you notice?
- 3) Repeat the test, but this time place the handle of the vibrating tuning fork on a table.
- 4) What do you notice?
- 5) What happens if the tuning fork is placed on a larger table?

My Results

Explanation

The vibrating tuning fork in the air is difficult to hear. Placing the vibrating fork on the table suddenly makes its sound louder or amplified. This is because the sound energy travels into the table and sends transverse waves through the wood particles. The transverse waves cause the table to vibrate, too. Because the surface area of the table is much larger, the sound vibrations impacting the air are increased and amplified.

This is how the soundboard of a piano works. When the hammer strikes a piano string, the string vibrates and sends compression sound waves into the air. The string itself is thin, so it doesn't produce a very loud sound, just like tuning fork, which has slender tines. However, because the piano string is connected to the soundboard with the bridge, the string's vibrations transfer energy to the soundboard and the entire thing starts to vibrate. The larger area vibrates and hits many more air particles than the string alone, which makes a much louder sound.

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