



Curiosity Guide #608

Piano Science

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

Ghost Note

Investigation #1

Description

Spook your friend by performing a ghostly trick on the piano!

Materials

- Piano
- A friend

Procedure

- 1) Play the C above middle C on the piano so your friend can get the sound in his or her mind.
- 2) Press the key down a second time but do it very slowly so that no sound is produced.
- 3) Why can't you hear anything?
- 4) While holding down the key, play the middle C and release it.
- 5) What do you and your friend notice?
- 6) Does the phenomenon work with other string combinations?

My Results

Explanation

Each key on a piano is connected to a little hammer that hits its own string and sounds a specific note. Most strings also have a damper that stops sound vibrations when the damper is resting on the string.

This investigation is an example of a sympathetic vibration. When you press the key the first time in a normal way, the damper lifts up so the hammer can strike the string and play the note. When the damper is lifted or "off," the string is said to be "open" and can vibrate.

When you slowly press down a key the second time, the action lifts the damper of the string, but the hammer doesn't strike the string.

When you play another note in the lower octave, the string wave excites the air particles, a compression wave moves across the piano, and a transverse wave travels through the string, bridge, and soundboard. Because the strings respond to the same frequency, just one harmonic higher, the higher string begins to vibrate as the wave energy transfers to the higher string. We hear that ghostly string seem to sing without ever being played.

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