



Curiosity Guide #608

Piano Science

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

Piano Dynamics

Investigation #6

Description

How does a piano get louder or softer? Find out!

Materials

- Piano
- A friend

Procedure

- 1) Open the lid to the piano and look for the soundboard, or wood base of the piano.
- 2) Close the lid and play several notes.
- 3) Open the lid and play the notes again. What did you notice?
- 4) Play a single note gently. Play the note a second time harder.
- 5) What did you notice?
- 6) Experiment with the pedals. How do the pedals change the sound?

My Results

Explanation

The soundboard is the wood base of a grand piano or back of an upright piano. The soundboard makes the sound louder. When you play a note, the hammer strikes a piano string. The string vibrates and makes compression sound waves in the air. The string itself is thin and doesn't produce a very loud sound. However, because the strings are connected to the soundboard with the bridge, the strings' 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 strings do alone, which makes a much louder sound. You can also increase how loud the piano is, or the amplitude, by putting the lid in different positions or striking the key harder. An open lid can reflect the sound out into the room to the audience. A key that is played harder strikes the string harder, but if you hit the key too aggressively produces a harsh tone. Keys should never be slapped but simply depressed to the key bed from the key surface.

Many pianos have three pedals. Pressing the left pedal causes the hammers to shift to one side so that the hammers don't hit as many strings. This makes a softer sound. Many pianos have a middle, or sostenuto pedal. The sostenuto pedal deactivates the dampers on notes, so the sound lasts longer. The right, or sustaining pedal, lifts all the dampers to make all the sounds last. The pedals can really change the dynamics of piano music.

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