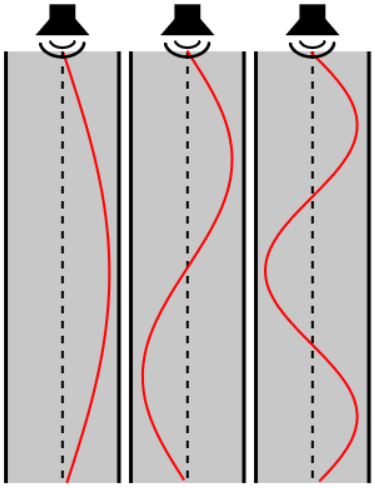
Resonance

Try It Out

Hold the tube by the wide end and spin it around in a circle. Try spinning it faster or slower. What do you hear?

(Image: ROCKYMART)



Three acoustic resonances in an open cylinder (Image: Xavier Snelgrove)

What's Going On?

In physics, **resonance** is a phenomenon in which a vibrating system or external force drives another system to oscillate with greater amplitude at specific frequencies. Put simply, a thing is made to vibrate at a frequency it likes to vibrate at. In this case, the air moving across the tube causes the tube to vibrate and whistle, but only at particular pitches. These pitches represent the tube's resonance frequencies.

Why Does It Matter?

If it weren't for resonance, there'd be no music in the world! Most musical instruments use resonance to produce sound. This includes your voice. You move air past your vocal chords, which vibrate at whatever frequency you choose to have them vibrate at to create the desired pitch. Resonance frequencies are also an important consideration in construction. Look up a video of the Tacoma Narrows bridge collapse, and you'll see that this is a lesson we learned the hard way.

Tacoma Narrows bridge displaying aeroelastic flutter, which may not technically be resonance, depending on how you define resonance.

Wonder While You Walk...

Clocks take advantage of resonant frequencies of physical objects to tell time. What other applications of resonance can you think of?