**Why does Helium make your voice high-pitched?**

Helium is found in party items such as balloons, and we know Helium, when inhaled, drastically increases the pitch of people's’ voices, resulting in a prank that is sure to come up in parties. Somewhat ironically, most people who use Helium to raise their voice’s pitch have no idea why it works! Well, after reading this short explanation, you’ll add another bit of knowledge to your brain, and perhaps, with some luck, you’ll be able to bring this up in a conversation and sound like the smartest person alive (a little exaggerated).

First things first. We have to understand how we, as humans, produce sounds. In our throat, we have two flaps of skin (actually mucous membrane) that are relaxed when we are breathing, allowing air to flow between the atmosphere and our lungs freely, and contracted when we are trying to speak. When this membrane is contracted, the airflow is restricted and begin to make the membrane vibrate (very much like how any instrument works), which, in turn creates sound. By varying the “tightness” of the membrane, we can control the pitch of the sound that is necessary for well, communication in general. Could you imagine if everyone was literally monotone?!?

Now you might be asking: “But, what does that have to do with anything?” Well, I’m about to tell you right now. The density of the air that passes through our vocal cords also change the pitch of the sound. You can compare it to viscosity; it is much harder for honey to flow through a tube in comparison to water. Contracting your mucous membrane increases air resistance which decreases pitch and the higher the density, the higher the resistance and therefore, the pitch will decrease. The “average air” density is 1.225 kg/m3 (composed of mostly nitrogen and oxygen) and gaseous helium is much lighter, coming in at around 0.164 kg/m3.

Now, we can easily see how helium increases the pitch of people’s voices. But, this stirs up a new question: if hydrogen is lighter than helium and hydrogen is much more common in the universe, why don’t we use hydrogen? If we pull a periodic table out of the internet (it’s the 21st century) we can see that helium falls under the noble gases, meaning that helium is a very stable element, also meaning that it is fairly safe to use use it. Hydrogen on the other hand is not stable and must bind to another element to keep it “happy”. To keep the hydrogen lighter than our helium, we only have one possible combination: H2 or hydrogen gas. Hydrogen gas is HIGHLY flammable, meaning that it could literally spontaneously combust. Hopefully, I need not say more and you understand why we don’t allow children to handle pure hydrogen.

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