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Poor Helmholtz! ETTORE BUDASSI, Univ Degli Studi Di Pavia, CHIARA AIM, Univ Degli Studi Di Pavia, INFN-Pavia, DANIELE AURELIO, DIEGO MARAGNANO, Univ Degli Studi Di Pavia, PAOLO MONTAGNA, MICHELE PIROLA, Univ Degli Studi Di Pavia, INFN-Pavia, SIMONE RESTELLI, Univ Degli Studi Di Pavia, DAVIDE SANTOSTASI, "Benedetto Cairoli" High School of Vigevano, Univ Degli Studi Di Pavia, SIMONE VENTURINI, LUCA ZATTI, Univ Degli Studi Di Pavia — We present an experimental measurement of the speed of sound based on Helmholtz resonators that students can recreate by themselves using only everyday items. A few ordinary glass bottles, a kitchen scale, a ruler and a free cell-phone app is all that is required to carry out a reasonable estimation of the speed of sound with a 10% uncertainty. The Helmholtz theory of resonances is introduced and tested by blowing across the top of a bottle with different volumes of water, and the frequency of the ensuing note is measured using the microphone of any modern smartphone. This experience has been proposed many times to high school students and teachers with a positive opinion. Despite the overall inexpensiveness and run-of-the-mill setup, the activity covers a variety of topics, ranging from harmonic oscillators to adiabatic processes in gases. On top of this, thanks to this experience, students face some typical measurement problems, such as search for error sources, error analysis, function linearization, and data fitting.

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