

Material:

Item Code	Qty	Description
P3120-1G	1	Function generator with digital display "inno"
P3120-1B	1	Rechargeable battery, "inno", 6V/10 Ah
P3120-4A	1	L-shaped assembly platform
DS085-1R	1	Round base with stand tube, uni
MB240-1LS	1	MBC Loudspeaker with nose
DS617-1H	1	Holder for MBCs "compact"
DT812-DB	1	Sound level meter "mini", BT
	2	Connecting lead

Goal:

Can we also "measure" the volume?

Setup:

- The "inno" function generator is plugged together with the battery and this unit is attached to the assembly platform.
- The loudspeaker is fixed in the round base with the holder.
- The loudspeaker is connected to the function generator with two cables.
- Settings on the function generator:
 - Frequency fine: very low (left)
 - Frequency rough: 1000 Hz
 - Waveform: Sine
 - Amplitude: very low (left)
- The sound level meter is placed about 15 cm in front of the loudspeaker and switched on.

Experiment 1:

We supply the loudspeaker with a frequency of about 200 Hz.
We now change the volume with the amplitude at the function generator.
We observe the measured values on the sound level meter.

Result:

The louder the sound, the higher the displayed value on the sound level meter.

Experiment 2:

At about 200 Hz, we set a low volume on the function generator.
Immediately next to the sound emitter, we clap our hands as loudly as possible. You can also give a loud shout.
Again, we pay attention to the display on the sound level meter.

Result:

The sound level meter also records brief events.

Volume - values db (A)

Whisper	20
Conversation	40
Street noise	80
Motorcycle	90
Jet plane	110
Pop Group	115
Pain threshold	120

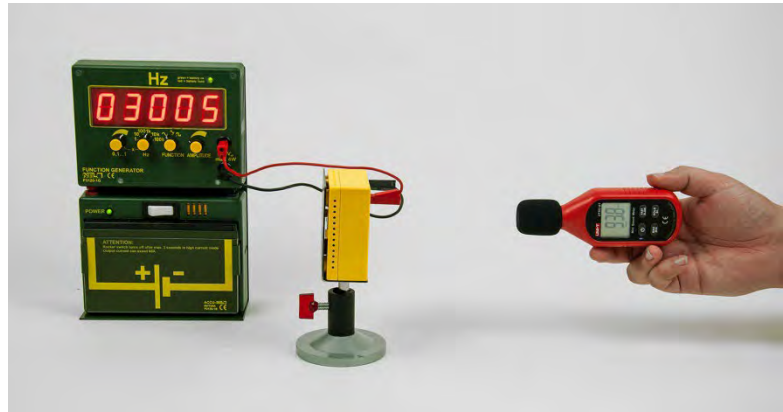
Attention!

Repeated or continuous noise above 90 dB (A) can cause hearing damage.
Above 150 dB (A), the eardrum can be destroyed.

For this reason, employees in noisy workplaces also wear hearing protection!

Experiment 3:

A tone of about 3000 Hz is first applied to the speaker and the volume is set to 70 dB. We note the volume. After that, a tone of about 200 Hz is applied and likewise regulated to 70 dB.



Result:

As previous tests have shown, the lower tone is perceived as quieter.

Explanation:

Loudness is a sound level sensation evaluated by our ear in a frequency-dependent manner.

Human hearing attenuates low and very high tones, while allowing medium frequencies to pass through virtually unhindered.

Notes on sound pressure:

The pressure fluctuations caused by air compression or air rarefaction are referred to as sound pressure. The lower hearing threshold at a tone of about 1000 Hz is 0.0002 μbar . The pain threshold is about 200 μbar .