

**GEEK
& CO.
SCIENCE!**



PROJECT KIT **Ages
8+**

GeekeR SPEAKER LAB



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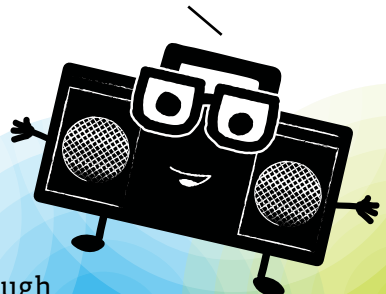
- 1 | Vibration speaker
- 2 | Bag of sand
- 3 | Plastic tray
- 4 | Protective film for speaker (on the speaker's adhesive pad)

YOU WILL ALSO NEED: *Two AAA batteries (1.5-volt, type AAA/LR03); small Phillips head (cross-head) screwdriver; audio source such as an MP3 player, cell phone with headphone jack, or sound system; empty box (such as a cereal box); two books or blocks; adhesive tape; signal generator app (optional)*

Hey Audio Geeks!

Are you ready to rock out to some great beats — and learn about the science of sound and how speakers work in the process? The vibration speaker in this kit turns practically any surface into a larger speaker. Stick the speaker onto a variety of surfaces and objects to find out which materials produce the best sound. Experiment to see sound waves ripple through a tray of sand or water. These instructions will show you how to do it. So let's get going!

Hi! I'm Boomer!



Experiment 2: Various materials

You will need:

Vibration speaker, audio source, a selection of various objects and materials from around your home or classroom

Here's how:

- 1 Remove the protective film from the vibrating pod, stick the speaker onto whatever object you have on hand, and start the music. Do you hear how the sound changes?
- 2 Try this experiment with a variety of different objects and materials. On this page, you can see a few examples of things you can try. But there are really no limits to what your imagination can come up with.



What's happening?

You will hear a different sound depending on the material you use. Metallic objects, for example, don't sound as nice as ones made from wood. The volume will also change as you use different objects. In general, the sound will be louder with hollow objects. But it also matters how well the material vibrates. Record your findings on page 16.



Experiment 3: Making sound visible

You will need:

Vibration speaker, black plastic tray, sand, audio source, two books or blocks, adhesive tape

Here's how:

- 1 Attach the vibration speaker's vibrating pod to the underside of the plastic tray. To keep the experiment tray from sitting on the vibration speaker's wire or resting on the vibrating pod itself, just set it on two equally-thick books or blocks. If the speaker becomes disconnected from the basin, you can also try securing it with some adhesive tape.
- 2 Cover your work area in newspaper or work in a place where some sand can be spilled and things can get a little bit messy.

- 3 Pour just a little sand into the tray — not so much that the bottom of the basin would be completely covered if the sand was spread out evenly.
- 4 Start your music, ideally a song with a lot of bass. If you have done everything right, the sand will move around in the basin and create some cool patterns.
- 5 Experiment with different songs and different volume levels.

